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973/5

Vol. 973 Number 5

# OFFICIAL GAZETTE

of the

## UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

August 29, 1978

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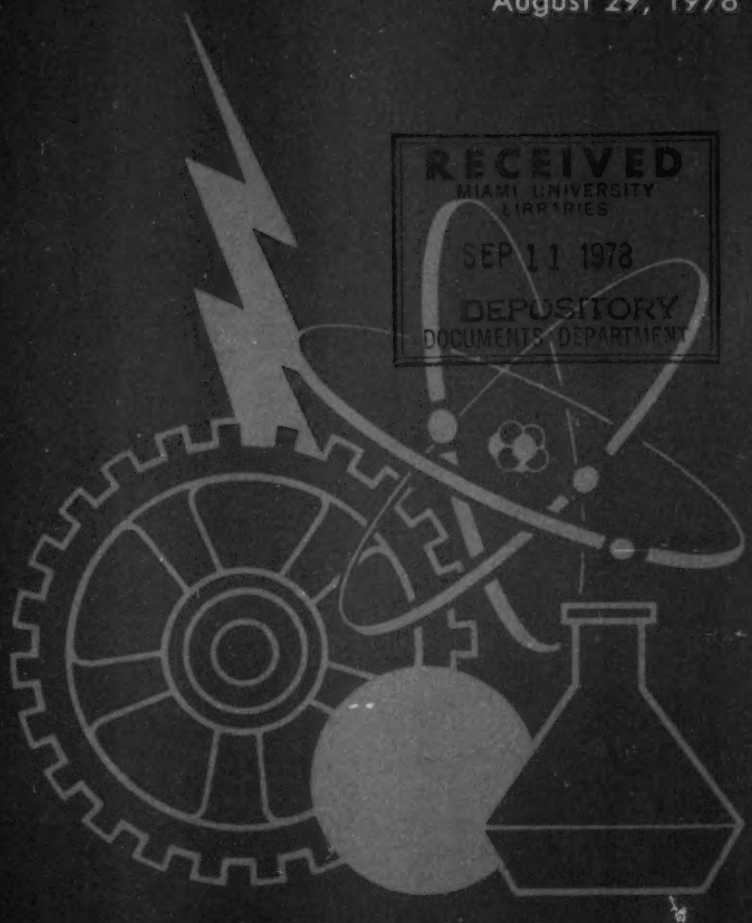

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# OFFICIAL GAZETTE of the
# UNITED STATES PATENT and TRADEMARK OFFICE

August 29, 1978 Volume 973 Number 5


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| General and Mechanical (4,109,320) | 2011 |
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# PATENT AND TRADEMARK OFFICE NOTICES

## Patent Cooperation Treaty Information

For information concerning the PCT including the amounts of the fees thereunder and the States that may be designated in International applications consult the Notice entitled "Patent Cooperation Treaty (PCT) Implementation: Information for Prospective Applicants" appearing in the OFFICIAL GAZETTE of May 16, 1978.

LUTRELLE F. PARKER,
May 2, 1978. *Acting Commissioner of Patents and Trademarks.*

## Board of Appeals Decisions Rendered in the Month of July 1978

| | |
|---|---|
| Affirmed | 209 |
| Affirmed in Part | 30 |
| Reversed | 63 |
| Total | 302 |

## REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

**3,427,720,** Re. S.N. 915,912, Filed Jun. 16, 1978, Cl. 32/27, HAND DRILLING, Herbert Berman, et al., Owner of Record: *Inventors,* Attorney or Agent: Charles Hieken, Ex. Gp.: 333

**3,804,251,** Re. S.N. 910,513, Filed May 30, 1978, Cl. 210/83, FLOATAGE COLLECTING APPARATUS AND METHOD, James H. Farrell, et al., Owner of Record: *JBF Scientific Corporation, Burlington, Mass.,* Attorney or Agent: Melvin R. Jenney, et al., Ex. Gp.: 176

**3,967,589,** Re. S.N. 920,859, Filed Jun. 30, 1978, Cl. 122/4 R, ENERGY GENERATING SYSTEM, Ronald I. Papineau, Owner of Record: *Inventor,* Attorney or Agent: George B. Finnegan Jr., et al., Ex. Gp.: 344

**3,978,197,** Re. S.N. 921,363, Filed Jul. 3, 1978, Cl. 423/332, WOOD FLY ASH REDUCTION METHOD, Erwin C. Betz, Owner of Record: *Inventor,* Attorney or Agent: James P. Hume, et al., Ex. Gp.: 113

**4,020,341,** Re. S.N. 913,373, Filed Jun. 7, 1978, Cl. 250/483, GENERATING AND USING COHERENT OPTICAL RADIATION, Ali Javan, Owner of Record: *Inventor,* Attorney or Agent: John N. Williams, Ex. Gp.: 256

**4,036,091,** Re. S.N. 921,364, Filed Jul. 3, 1978, Cl. 83/319, UNIVERSAL DOUBLE CUT DIE SET, Alexander Borzym, Owner of Record: *Inventor,* Attorney or Agent: Allen M. Krass, et al., Ex. Gp.: 324

**4,066,425,** Re. S.N. 878,588, Filed Feb. 16, 1978, Cl. 55/242, VENTILATING APPARATUS WITH FILTER EXCHANGE, Louis A. Nett, Owner of Record: *Inventor,* Attorney or Agent: Elwin A. Andrus et al., Ex. Gp.: 177

**4,079,480,** Re. S.N. 918,738, Filed Jun. 23, 1978, Cl. 16/87 R, CLAMPING APPARATUS, Vernon S. Oase, Owner of Record: *Owens-Corning Fiberglas, Toledo, Ohio,* Attorney or Agent: Ronald C. Hudgens, Ex. Gp.: 353

**4,083,723,** Re. S.N. 921,677, Filed Jul. 3, 1978, Cl. 96/66.5, PROCESS FOR COLOR PHOTOGRAPHIC PROCESSING, Isao Shimamura, et al., Owner of Record: *Inventor,* Attorney or Agent: Richard C. Sughrue, et al., Ex. Gp.: 166

# PATENT NOTICES

## Certificates of Correction for the Week of Aug. 29, 1978

| | | | |
|---|---|---|---|
| Re.29,605 | 4,064,347 | 4,075,874 | 4,084,358 |
| D.247,655 | 4,064,629 | 4,076,628 | 4,084,796 |
| 3,775,070 | 4,065,488 | 4,077,537 | 4,084,855 |
| 3,676,154 | 4,065,571 | 4,077,655 | 4,084,887 |
| 3,879,456 | 4,066,228 | 4,077,944 | 4,085,031 |
| 3,941,012 | 4,066,294 | 4,078,216 | 4,085,055 |
| 3,973,808 | 4,066,372 | 4,078,459 | 4,085,213 |
| 3,982,582 | 4,066,781 | 4,078,556 | 4,085,240 |
| 4,023,570 | 4,067,249 | 4,078,560 | 4,085,473 |
| 4,024,968 | 4,067,963 | 4,079,723 | 4,085,616 |
| 4,030,307 | 4,068,209 | 4,080,311 | 4,085,687 |
| 4,034,545 | 4,068,338 | 4,080,492 | 4,085,789 |
| 4,038,682 | 4,069,193 | 4,080,721 | 4,085,819 |
| 4,040,346 | 4,069,580 | 4,081,472 | 4,086,024 |
| 4,042,380 | 4,070,407 | 4,082,615 | 4,086,082 |
| 4,051,314 | 4,070,465 | 4,082,664 | 4,086,432 |
| 4,052,383 | 4,070,961 | 4,082,750 | 4,086,518 |
| 4,053,517 | 4,071,141 | 4,082,968 | 4,086,652 |
| 4,054,431 | 4,071,508 | 4,083,005 | 4,086,704 |
| 4,061,638 | 4,072,450 | 4,083,769 | 4,087,220 |
| 4,062,902 | 4,072,458 | 4,084,226 | 4,087,504 |
| 4,063,452 | 4,075,739 | 4,084,227 | 4,087,595 |

## Dedications

3,072,582.—*Charles Bedell Frost,* Glendora, Calif. POLYETHER-URETHANE FOAMS AND METHODS OF MAKING SAME. Patent dated Jan. 8, 1963. Dedication filed Nov. 15, 1976, by the assignee, *The General Tire & Rubber Company.*

Hereby dedicates to the Public the remaining term of said patent.

3,923,176.—*Edward J. Wynn, Fresón,* and *Lee D. Butler,* Kingsburg, Calif. FIRST TABLE FOR A BALE WAGON. Patent dated Dec. 2, 1975. Dedication filed July 3, 1978, by the assignee, *Sperry Rand Corporation.*

Hereby dedicates to the Public the entire remaining term of said patent.

4,008,850.—*John J. Goodrich,* Rumford, R.I. GUSSETED PINCH BOTTOM BAG. Patent dated Feb. 22, 1977. Dedication filed May 8, 1978, by the assignee, *St. Regis Paper Company.*

Hereby dedicates to the Citizens of the United States of America the remaining term of said patent.

## Disclaimers

Reissue No. 28,598.—*Ralph H. Baer,* Manchester, and *William T. Rusch* and *William L. Harrison,* Hollis, N.H. TELEVISION GAMING APPARATUS AND METHOD. Patent dated Oct. 28, 1975. Disclaimer filed Apr. 17, 1978, by the assignee, *Sanders Associates, Inc.*

Hereby enters this disclaimer to claims 1, 2, 5, 6, 13, 14, 15 and 16 of said patent.

3,089,790.—*Lewis Balamuth,* New York, *Claus Kleesattel,* Forest Hills, and *Arthur Kuris,* Riverdale, N.Y. ULTRASONIC CLEANING DEVICES AND METHOD OF CLEANING. Patent dated May 14, 1963. Disclaimer filed Mar. 3, 1978, by the assignee, *Cavitron Corporation.*

Hereby enters this disclaimer to claim 13 of said patent.

3,348,814.—*Robert P. Shaw,* New York, N.Y. METHODS AND MEANS FOR PRODUCING PHYSICAL, CHEMICAL AND PHYSICO-CHEMICAL EFFECTS BY LARGE-AMPLITUDE SOUND WAVES. Patent dated Oct. 24, 1967. Disclaimer filed June 16, 1978, by the assignee, *Macrosonic Process Corporation.*

Hereby enters this disclaimer to claims 1 and 3 of said patent.

3,406,757.—*August B. Baumstimler,* Odessa, Tex. WELL CLEAN-OUT TOOL. Patent dated Oct. 22, 1968. Disclaimer filed June 19, 1978, by the inventor.

Hereby enters this disclaimer to claims 1, 3, 4, 5 and 7 of said patent.

3,854,339.—*Richard Muller,* Worfelden, Germany. PROCESS AND DEVICE FOR BALANCING OF ROTORS. Patent dated Dec. 17, 1974. Disclaimer filed July 7, 1978, by the assignee, *American Hofmann Corporation.*

Hereby enters this disclaimer to claim 10 of said patent.

4,020,204.—*John Sebring Taylor,* Newark, Del., and *Wilbur Thomas Brader,* Media, Pa. VINYL TRANSFER SHEET MATERIAL AND METHOD FOR APPLYING SAME TO VINYL SUBSTRATE. Patent date Apr. 26, 1977. Disclaimer filed July 7, 1978, by the assignee, *FMC Corporation.*

Hereby enters this disclaimer to claims 1–10 of said patent.

4,024,113.—*Vernon G. Ammons,* Glenshaw, Pa. POLYCARBONATE POLYURETHANES BASED AN PARTICULAR ALIPHATIC/CYCLOALIPHATIC POLYCARBONATES. Patent dated May 17, 1977. Disclaimer filed July 3, 1978, by the assignee, *PPG Industries, Inc.*

Hereby enters this disclaimer to claims 1 through 8 of said patent.

4,034,937.—*William James Fillery,* Belfast, Northern Ireland. POSITION REFERENCE DEVICES. Patent dated July 12, 1977. Disclaimer filed July 6, 1978, by the assignee, *Short Brothers Limited.*

Hereby enters this disclaimer to all claims of said patent.

4,062,881.—*Thomas G. Kugele,* Cincinnati, Ohio. SULFIDE CONTAINING TIN STABILIZERS. Patent dated Dec. 13, 1977. Disclaimer filed July 5, 1978, by the assignee, *Cincinnati Milacron Chemicals, Inc.*

Hereby enters this disclaimer to claims 2, 45, 55, 59 and 60 of said patent.

## National Technical Information Service

GOVERNMENT-OWNED INVENTIONS

*Notice of Availability for Licensing*

The inventions listed below are owned by the U.S. Government and are available for domestic and possibly foreign licensing in accordance with the licensing policies of the agency-sponsors.

Copies of the patents cited are available from the Commissioner of Patents and Trademarks, Washington, D.C. 20231, for $.50 each. Requests for copies of patents must include the patent number.

Copies of the patent applications can be purchased from the National Technical Information Service (NTIS), Springfield, Va. 22161 for $4.00 ($8.00 outside North American Continent). Requests for copies of patent applications must include the patent application number. Claims are deleted from patent application copies sold to the public to avoid premature disclosure in the event of an interference before the Patent and Trademark Office. Claims and other technical data will usually be made available to serious prospective licensees by the agency which filed the case.

Requests for licensing information on a particular invention should be directed to the address cited for the agency-sponsor.

DOUGLAS J. CAMPION,
*Patent Program Coordinator,*
*National Technical Information Service.*

U.S. DEPARTMENT OF THE AIR FORCE
AF/JACP, 1900 Half St., S.W.
Washington, D.C. 20324

Patent application 880,748. Method for Increasing the Dispersibility of Aluminum Metal Powders. Filed Feb. 23, 1978.

Patent application 880,812. Planar Liquid Crystal Matrix Array Chip. Filed Feb. 23, 1978.

Patent application 880,910. Switch Debounce Circuit. Filed Feb. 23, 1978.

U.S. DEPARTMENT OF ENERGY
Assistant General Counsel for Patents
Washington, D.C. 20545

Patent 4,045,673. Test Chamber for Alpha Spectrometry. Filed May 12, 1976. Patented Aug. 30, 1977. Not available NTIS.

U.S. DEPARTMENT OF THE NAVY
Assistant Chief for Patents, Office of Naval Research, Code 302, Arlington, Va. 22217

Patent application 838,598. Gas Generating System. Filed Oct. 3, 1977.

Patent application 841,240. Electro-Optical Radio System. Filed Oct. 7, 1977.

Patent application 857,720. Variable Volume Depth Control. Filed Dec. 5, 1977.

Patent application 864,403. Controlled Radius Tether/Termination Assembly. Filed Dec. 27, 1977.

Patent application 864,964. Undersea Tether/Termination Assembly. Filed Dec. 27, 1977.

Patent application 871,562. Safe High Energy Density Battery. Filed Jan. 23, 1978.

Patent application 871,877. Super High Energy Density Battery. Filed Jan. 24, 1978.

Patent application 875,254. Tunable Infrared Detector With Narrow Bandwidth. Filed Feb. 6, 1978.

Patent application 877,633. Serriform Strip Crosstie Memory. Filed Feb. 14, 1978.

Patent application 881,927. Failure-Resistant Pseudo Nonvolatile Memory. Filed Feb. 28, 1978.

Patent application 882,500. Vector Measuring Current Meter. Filed Mar. 1, 1978.

Patent application 889,072. Method of Producing Population Inversion and Lasing at Short Wavelengths by Charge Transfer. Filed Mar. 22, 1978.

Patent application 889,666. Polarization-Independent Optical Switches/Modulators. Filed Mar. 24, 1978.

Patent application 893,545. Laser Scan Converter. Filed Apr. 5, 1978.

Patent 4,023,118. Superheterojunction Laser. Filed Mar. 24, 1975. Patented May 1977. Not available NTIS.

Patent 4,024,067. Processes for the Preparation of Biszenoins and Bis-Benzils. Filed Jan. 7, 1976. Patented May 17, 1977. Not available NTIS.

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U.S. DEPARTMENT OF THE AIR FORCE
AF/JACP, 1900 Half St. SW.
Washington, D.C. 20324

Patent application 880,750. Sliding Air Seal for Electronic Assemblies. Filed Feb. 23, 1978.

U.S. DEPARTMENT OF AGRICULTURE
Research Agreements and Patent Branch, General Services Div., Federal Bldg., Agricultural Research Service
Hyatsville, Md. 20782

Patent application 839,711. Preparation of Protein Concentrates From Whey and Seed Products. Filed Oct. 5, 1977.

Patent 4,035,349. Inhibiting the Formation of Lysinoalanine. Filed June 9, 1975. Patented July 12, 1977. Not available NTIS.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
National Institutes of Health, Chief, Patent Branch
Westwood Building, Bethesda, Md. 20014

Patent 4,078,052. Large Unilamellar Vesicles (LUV) and Method of Preparing Same. Filed June 30, 1976. Patented Mar. 7, 1978. Not available NTIS.

U.S. DEPARTMENT OF THE INTERIOR
Branch of Patents, 18th and C Sts NW.
Washington, D.C. 20590

Patent application 848,851. Process for Reducing Molten Furnace Slags by Carbon Injection. Filed Nov. 7, 1977.

Patent application 853,700. Cartridge for Grouting an Anchor Element in a Hole of a Support Structure. Filed Nov. 21, 1977.

Patent application 860,249. Recovery of Metals From Sea Nodules. Filed Dec. 13, 1977.

Patent application 870,161. Separation of Plastics by Flotation. Filed Jan. 17, 1978.

Patent application 874,953. Trigger Device for Explosion Barrier. Filed Feb. 3, 1978.

Patent 4,053,305. Recovery of Copper and Silver From Sulfide Concentrates. Filed Oct. 15, 1976. Patented Oct. 11, 1977. Not available NTIS.

Patent 4,062,744. Extraction of Copper From Sulfide Ores. Filed July 16, 1976. Patented Dec. 13, 1977. Not available NTIS.

Patent 4,066,992. Seismic Mine Monitoring System. Filed Oct. 9, 1975. Patented Jan. 3, 1978. Not available NTIS.

Patent 4,072,015. Borehole Aerostatic Ground Support System. Filed Dec. 30, 1976. Patented Feb. 7, 1978. Not available NTIS.

Patent 4,072,587. Separate Recovery of Silver and Gold From Cyanide Solutions. Filed Apr. 21, 1977. Patented Feb. 7, 1978. Not available NTIS.

Patent 4,072,798. Bioelectric Neutralization of Acid Waters. Filed July 26, 1977. Patented Feb. 7, 1978. Not available NTIS.

U.S. DEPARTMENT OF THE NAVY
Assistant Chief for Patents, Office of Naval Research, Code 302, Arlington, Va. 22217

Patent application 888,125. Substituted-6,7,8,9-Tetrahydro-Pyrido-and 2H-Pyrano (2,3-b) (1,8) Naphthyridines, Stable, Efficient Laser Dyes. Filed Mar. 20, 1978.

Patent 4,029,859. Thermal Sensor and Current Generator. Filed Oct. 14, 1975. Patented June 14, 1977. Not available NTIS.

Patent 4,033,267. Fluoric Cartridge Initiator. Filed Oct. 1, 1976. Patented July 5, 1977. Not available NTIS.

Patent 4,040,880. Perchlorate Sensitizing Agent. Filed June 28, 1973. Patented Aug. 9, 1977. Not available NTIS.

Patent 4,043,526. Autopilot Hardover Failure Protection System. Filed Feb. 23, 1976. Patented Aug. 23, 1977. Not available NTIS.

Patent 4,047,121. RF Signal Generator. Filed Oct. 16, 1975. Patented Sept. 6, 1977. Not available NTIS.

Patent 4,050,968. Explosive Composition Containing a Hydroxyalkyl Acrylate Copolymer Binder. Filed Apr. 29, 1970. Patented Sept. 27, 1977. Not available NTIS.

Patent 4,051,339. Variable Time Missile Safety Timer. Filed Dec. 28, 1964. Patented Sept. 27, 1977. Not available NTIS.

Patent 4,054,871. Electromagnetic Intrusion Sensor. Filed Sept. 9, 1974. Patented Oct. 18, 1977. Not available NTIS.

Patent 4,057,803. Adaptive Direction of Arrival Antennae System. Filed Apr. 8, 1976. Patented Nov. 8, 1977. Not available NTIS.

Patent 4,061,658. 2,5-Dipicrylfurans. Filed Mar. 23, 1977. Patented Dec. 6, 1977. Not available NTIS.

Patent 4,062,058. Next Address Subprocessor. Filed Feb. 13, 1976. Patented Dec. 6, 1977. Not available NTIS.

# PATENT EXAMINING CORPS

**RENE D. TEGTMEYER, Assistant Commissioner**

**WILLIAM FELDMAN, Deputy Assistant Commissioner**

## CONDITION OF PATENT APPLICATIONS AS OF JULY 15, 1978

| PATENT EXAMINING GROUPS | Actual Filing Date of Oldest New Case Awaiting Action |
|---|---|
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices. | 9-6-77 |
| GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides. | 10-17-77 |
| HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes. | 11-17-77 |
| COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography. | 7-18-77 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes. | 8-1-77 |
| **ELECTRICAL EXAMINING GROUPS** | |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales. | 4-8-77 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material. | 1-13-77 |
| INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts. | 7-11-77 |
| RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating. | 1-3-78 |
| ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring. | 1-17-77 |
| DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts. | 10-14-76 |
| **MECHANICAL EXAMINING GROUPS** | |
| HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment. | 6-23-77 |
| MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks. | 1-9-77 |
| AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination. | 5-11-77 |
| HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GRAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication. | 6-2-77 |
| GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines. | 1-19-77 |

**Expiration of patents:** The patents within the range of numbers indicated below expire during July 1978, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,990,549 to 2,994,086, inclusive
Plant Patents..... Numbers 2,067 to 2,075, inclusive

# REISSUES

## AUGUST 29, 1978

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

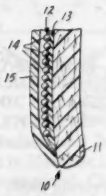
### Re. 29,742
### RETROREFLECTIVE PROTECTIVE HELMET

**Chi Fang Tung, Mahtomedi, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.**

**Original No. 3,885,246, dated May 27, 1975, Ser. No. 412,920, Nov. 5, 1973. Application for reissue Feb. 24, 1977, Ser. No. 771,541**

**Int. Cl.[2] A42B *3/02*; G02B *5/12***

**U.S. Cl. 2—412** **3 Claims**




1. A protective helmet comprising a protective shell adapted to be worn on a person's head; a retroreflective layer disposed over substantially all of the outer surface of the protective shell, comprising a layer of binder material and a monolayer of transparent glass microspheres that are partially embedded in the layer of binder material and have a coating of specular reflective material on their embedded surfaces; and a transparent sheet having the shape of the protective shell disposed directly over the retroreflective layer, said sheet being in tight frictional engagement with said retroreflective layer but without optical contact to the exposed surfaces of the microspheres and being attached to the protective shell at least around the periphery of the retroreflective layer so as to provide an airtight sealed pocket between the retroreflective layer and the transparent sheet, whereby the retroreflective layer retroreflects light shined at the helmet under either wet or dry conditions.

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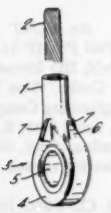
### Re. 29,743
### CABLE ATTACHMENTS

**Brian Edgar Lund Biram, Johannesburg, South Africa, assignor to C.C.L. Systems Limited, England**

**Original No. 3,910,055, dated Oct. 7, 1975, Ser. No. 473,546, May 28, 1974. Application for reissue Jul. 5, 1977, Ser. No. 812,549**

**Int. Cl.[2] F16G *11/00***

**U.S. Cl. 61—45 B** **2 Claims**




1. A cable anchor element having a socket at one end for receiving only a straight portion of a cable end therein and a load supporting member at the other end, said cable support element including an intermediate section that includes a plurality of radially extending members which gently converge from a widest point adjacent said load supporting member to a narrowest point surrounding said socket, said cable anchor element being securable in a recess of a wall with said socket end inserted in said recess and said radially extending members of said intermediate section secured in the mouth of said recess so that said load supporting member is exposed to support an external member adjacent said wall, said supporting element comprises at least two hook members, said hook member being rooted to said intermediate sections with said hook members converging gently toward a narrowest point surrounding said socket.

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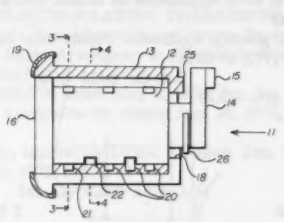
### Re. 29,744
### KEY CONTROLLED SECURITY APPARATUS

**George P. Patriquin, 69 Lynde St., Gardner, Mass. 01440**

**Original No. 3,973,421, dated Aug. 10, 1976, Ser. No. 565,777, Apr. 7, 1975. Application for reissue Jul. 13, 1977, Ser. No. 815,259**

**Int. Cl.[2] E05B *27/00***

**U.S. Cl. 70—364 R** **17 Claims**




1. A lock comprising:

a housing;

an actuator means retained by and rotatable between predetermined stations within said housing, said actuator defining a keyway for receiving a key;

operator means for effecting control functions in response to rotation of said actuator means into said predetermined stations;

locking tumbler means coupled between said housing and said actuator means and extending into said keyway, said locking tumbler means being biased in a locking position and movable into a shear position by a proper key in said keyway;

locking tumber blocking means preventing rotational movement of said actuator means from a locked station with said locking tumbler means in said locking positions and allowing rotational movement thereof with said locking tumbler means in said shear positions;

first directional tumbler means coupled between said housing and said actuator means and extending into said keyway, said first directional tumbler means movable between a quiescent position and an active position by a proper key in said keyway;

first blocking means allowing rotation of said actuator means in one direction from said locked station and preventing rotation thereof in the opposite direction with said first tumbler means in said quiescent position, and allowing rotation of said actuator means in said opposite direction from said locked station with said first tumbler means in said active position;

second directional tumbler means coupled between said housing and said actuator means and extending into said keyway, said second directional tumbler means being movable between a primary position and an auxiliary position by a proper key in said keyway; and

second blocking means allowing rotation of said actuator

means in said one direction from said locked station with said second tumbler means in said primary position, and allowing rotation of said actuator means in said opposite direction from said locked station and preventing rotation thereof in said one direction with said second tumbler means in said auxiliary position.

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**Re. 29,745**
**PRINTER**

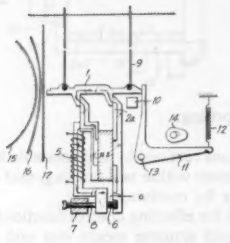
**Yoshifumi Gomi, Chino, Japan, assignor to Shinshu Seiki Kabushiki Kaisha and Kabushiki Kaisha Suwa Seikosha, both of Tokyo, Japan**

**Original No. 3,878,778, dated Apr. 22, 1975, Ser. No. 322,840, Jan. 11, 1973. Application for reissue Oct. 27, 1976, Ser. No. 736,045**

**Claims priority, application Japan, Jan. 11, 1972, 47-5379; Jan. 17, 1972, 47-6816**

**Int. Cl.[2] B41J *9/38***

**U.S. Cl. 101—93.29** **9 Claims**



1. In a printer having respective control means for print hammers which are arranged in a plurality of columns and each of which is displaceable between a rest position and a print position, and having respective deformable elastic bodies maintained in deformed condition by the associated print hammers in the rest position, improved magnetic circuit control means associated with each of said columns for [selectively] holding each said print hammer at its rest position and *selectively* releasing same for displacement to a print position including a permanent magnet [common to at least two of said columns], a first hammer hold magnetic circuit portion associated with each print hammer including a portion of the associated print hammer and a second release magnetic circuit portion associated with each print hammer including release coil means and means for adjusting the magnetic reluctance of the release magnetic circuit portion said release coil means including means for applying signals thereto, said first and second magnetic circuit portions being connected in parallel with said permanent magnet, each of said magnetic circuit control means being adapted to hold said respective hammers in said rest position and to release said respective hammer upon application of a signal to its release coil means by means of said signal applying means in a direction so as to decrease the magnetomotive force applied to said hammer, the energy stored in the respective deformed body displacing said respective hammer from said rest position to said print position upon said decrease in said magnetomotive force.

**Re. 29,746**
**APPARATUS FOR PULPING WASTE PAPER MATERIALS**

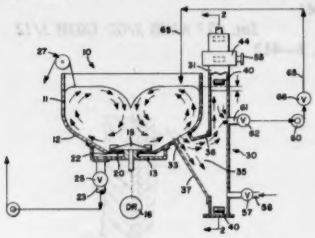
**Joseph Walter Couture, Montreal, Canada, assignor to The Black Clawson Company, Middletown, Ohio**

**Original No. 4,030,671, dated Jun. 21, 1977, Ser. No. 692,885, Jun. 4, 1976. Application for reissue Aug. 5, 1977, Ser. No. 822,379**

**Claims priority, application Canada, Jun. 16, 1975, 229393**

**Int. Cl.[2] B02C *23/36***

**U.S. Cl. 241—15** **12 Claims**



1. Apparatus for recovering paper making fiber from waste paper products including substantial quantities of plastic film and other lightweight non-paper contaminants, comprising:

a. a tub for receiving such waste paper products and water to at least a predetermined minimum level,

b. a rotor mounted for rotation in said tub to pulp such waste paper products to aqueous slurry form,

c. means for extracting from said tub a liquid suspension of small particles of less than a predetermined maximum size,

d. an outlet in said tub bottom separate from said extracting means,

e. junk removing means including a casing adjacent said tub and of at least the same height,

f. a chute connecting said outlet with said casing and providing for liquid flow between said tub and said casing,

[g. a pump having its inlet connected with said casing at a level below said minimum level in said tube,]

[h.] *g.* means for [driving said pump to withdraw] *withdrawing* sufficient liquid from said casing to maintain the liquid level in said casing below that in said tub and thereby to induce flow of liquid and lightweight contaminants from said tub to said casing by way of said chute,

[i.] *h.* means [connecting the outlet of said pump with said tub to recirculate] *for recirculating* withdrawn liquid back into said tub, and

[j.] *i.* means for collecting lightweight contaminants in the upper portion of said casing for removal therefrom.

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**Re. 29,747**
**LIQUID RING PUMP LOBE PURGE**

**Kenneth W. Roe, Winfield, Ill.; Ernest E. Studwell, East Norwalk, and Robert E. Cooke, West Redding, both of Conn., assignors to Nash Engineering Company, Norwalk, Conn.**

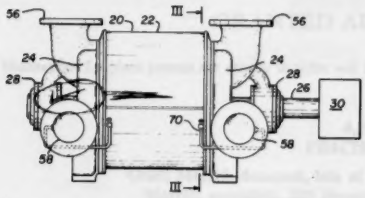
**Original No. 3,846,046, dated Nov. 5, 1974, Ser. No. 321,602, Jan. 8, 1973. Continuation of Ser. No. 120,421, Mar. 3, 1971, abandoned. Application for reissue Mar. 21, 1977, Ser. No. 779,387**

**Int. Cl.[2] F04C *19/00***

**U.S. Cl. 417—54** **8 Claims**

1. A method of reducing wear in liquid ring pumps which would result from abrasive action of contaminants carried in the liquid of the ring which method comprises, *determining the region where excessive wear would occur as a result of contaminants carried by the liquid ring,* forming conduit means opening to the interior of the ring chamber at [a] *said* region [where,

but for that opening, excessive wear would occur] and during operation of the pump, purging a portion of the ring liquid and




a substantial part of the contaminants of the ring through said conduit means.

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**Re. 29,748**

## DRY WORKING BLACK IMAGE COMPOSITIONS COMPRISING ORGANIC HALOGEN COMPOUNDS AND ETHYLENE COMPOUNDS

**Harry L. Fichter, Jr., Hudson, and James M. Lewis, Aurora, both of Ohio, assignors to Horizons Incorporated a division of Horizons Research Incorporated, Cleveland, Ohio**

**Original No. 3,510,304, dated May 5, 1970, Ser. No. 603,731, Dec. 22, 1966. Application for reissue Dec. 6, 1976, Ser. No. 747,978**

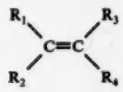
**Int. Cl.[2] G03C** *5/04, 1/52, 5/24*

**U.S. Cl. 96—27 E** **11 Claims**

1. A photosensitive composition comprising:

(a) an organic halogen compound having at least three halogen atoms attached to a terminal carbon atom; and

(b) a substantially colorless ethylene compound represented by the formula




wherein $R_1$ and $R_2$ each represent a p-dialkylaminophenyl group in which the alkyl groups are selected from the group consisting of methyl and ethyl, and each of $R_3$ and $R_4$ represents a monovalent material selected from the group consisting of H, halogen, alkyl, aryl, and other monovalent groups which do not interfere with the resonance of the ethylenic double bond connecting the two carbon atoms;

said constituents being present in proportions which yield a near neutral or black image when reacted with the products resulting from the photolytic exposure of said organic halogen compound; and

(c) a support for said composition.

6. A dry working photographic process which comprises preparing composition of claim 1 in a thin film; exposing said composition to a pattern of radiant energy, whereby a neutral or nearly black image prints out directly as a result of said exposure; and fixing said image in said composition by heating the same.

*8. A dry working photographic process according to claim 6 wherein said exposure comprises an exposure to the equivalent of 0.001 to 1.0 watt seconds/per square centimeter through a negative or positive original whereby an image prints out directly as the result of said exposure.*

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**Re. 29,749**

## TRIVALENT CHROMIUM ELECTROPLATING BATHS AND ELECTROPLATING THEREFROM

**Jeffrey Gyllenspetz, Knaresborough, and Stanley Renton, Penkridge, both of England, assignors to Albright & Wilson Ltd., Oldbury, England**

**Original No. 3,954,574, dated May 4, 1976, Ser. No. 530,158, Dec. 6, 1974. Application for reissue Aug. 26, 1977, Ser. No. 827,958**

**Claims priority, application United Kingdom, Jun. 17, 1974, 2665/74; Dec. 13, 1973, 57872/73**

**Int. Cl.[2] C25D** *3/06, 3/56*

**U.S. Cl. 204—43 T** **30 Claims**

*31. An aqueous electroplating bath for electrodepositing chromium-iron alloys consisting essentially of water, from 0.2 to 0.6 molar trivalent chromium and iron cation in an amount up to saturation for the electrodeposition of chromium-iron alloys, from 0.05 to 0.3 molar bromide, formate in a molar ratio of formate to chromium of from 2:1 to 1:1, from 1 to 3 molar ammonium, from 0.5 to 1 molar borate, from 2.5 to 3.5 molar of anion selected from chloride and sulphate and having a pH between 1 and 4.*

# PLANT PATENTS

## GRANTED AUGUST 29, 1978

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

**4,295**

### PEACH TREE

**Grant Merrill, deceased, late of Red Bluff, Calif., by Lucile B. Merrill, executrix, 325 Breese Ave., Red Bluff, Calif. 96080**

**Filed Jul. 29, 1977, Ser. No. 820,919**
**Int. Cl.[2] A01H *5/03***
**U.S. Cl. Plt.—43** **1 Claim**

**1.** A new and distinct variety of peach tree, substantially as illustrated and described, which is of medium size, medium vigor, spreading, open, vase-formed, and hardy; foliated with medium size, acuminate, lanceolate, acutely pointed, thin, dark green leaves having a crenate, finely serrate margin and a short, thick petiole, and a regular and very productive bearer of uniform, evenly ripening, large-to-medium size, nearly globose or very broadly ovate, semi-freestone fruit having yellow skin substantially overspread with red, and firm, fine, crisp, meaty, yellow flesh streaked with red; the variety being more particularly characterized–in comparison to the Merrill Gem Free peach—by fruit that ripens at the same time but averages slightly larger in size; the fruit—with fewer split pits—being rounder, more symmetrical, more firm of flesh, and with better shipping quality.

# PATENTS

## GRANTED AUG. 29, 1978

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 068–200 | 4,109,483 |
| 074–388 R | 4,109,529 |
| 166–315 | 4,109,728 |
| 400–124 | 4,109,776 |
| 400–124 | 4,109,777 |
| 400–154.2 | 4,109,778 |
| 400–584 | 4,109,779 |
| 206–326 | 4,109,876 |
| 062–054 | 4,110,091 |
| 062–064 | 4,110,092 |
| 521–063 | 4,110,264 |
| 521–030 | 4,110,265 |
| 521–057 | 4,110,267 |
| 521–177 | 4,110,268 |
| 521–081 | 4,110,269 |
| 521–121 | 4,110,270 |
| 521–111 | 4,110,271 |
| 521–111 | 4,110,272 |
| 521–059 | 4,110,273 |
| 521–157 | 4,110,274 |
| 521–123 | 4,110,276 |
| 528–119 | 4,110,309 |
| 528–119 | 4,110,310 |
| 528–215 | 4,110,311 |
| 528–215 | 4,110,312 |
| 528–090 | 4,110,313 |
| 528–126 | 4,110,314 |
| 528–294 | 4,110,315 |
| 526–068 | 4,110,316 |
| 528–077 | 4,110,317 |
| 528–073 | 4,110,318 |
| 526–017 | 4,110,319 |
| 544–385 | 4,110,327 |
| 544–380 | 4,110,328 |
| 528–170 | 4,110,364 |
| 260–603 R | 4,110,403 |
| 219–101 | 4,110,577 |
| 179–156 R | 4,110,583 |
| 364–463 | 4,110,605 |
| 252–522 | 4,110,626 |
| 358–004 | 4,110,761 |

# PATENTS

GRANTED AUG. 29, 1978

ERRATA

# PATENTS

## GRANTED AUGUST 29, 1978

## GENERAL AND MECHANICAL

**4,109,320**

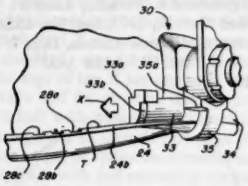
**ATTACHING ASSEMBLY**

**Marshall N. Anderson, Grayslake, Ill., assignor to Sellstrom Manufacturing Company, Palatine, Ill.**

**Filed Jun. 10, 1977, Ser. No. 805,537**

**Int. Cl.[2] A61F 9/06**

**U.S. Cl. 2—10** **20 Claims**




1. An assembly for use in attaching a secondary unit to a primary unit wherein the latter is provided with an exterior wall surface and a flange extending from the wall surface and disposed in spaced, substantially face-to-face relation with the wall surface; said assembly comprising at least one removable bracket having a base portion adapted to slidably engage the wall surface, and releasable means extending from said base portion for disposition between the flange and the wall surface and slidably engaging the flange and retaining the bracket in predetermined positions on the primary unit; and means coacting with the bracket base portion for connecting the secondary unit thereto.

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**4,109,321**

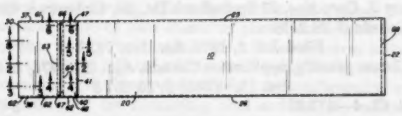
**SCARF CONSTRUCTIONS HAVING A SUBSTANTIALLY CONCEALABLE POCKET THEREIN, AND METHODS OF PRODUCING SAME**

**Rosella Shapiro, 3530 N. Lake Shore Dr., Chicago, Ill. 60657**

**Filed Jan. 3, 1977, Ser. No. 756,346**

**Int. Cl.[2] A41D 23/00**

**U.S. Cl. 2—91** **39 Claims**



1. An improved fabric scarf construction having a substantially concealable purse, or pocket thereof, provided within the confines of overlapping fabric and positioned at or in the vicinity of at least one end portion of the scarf, which comprises:

a length of elongated fabric having outer ends and side edges positioned at outer ends and side edges, respectively, of the scarf;

a first, shorter length of fabric having outer and inner ends and side edges; said first, shorter length of fabric being positioned at an end of said elongated fabric in overlapping relationship with only part of the length of said elongated fabric, and having substantially the same width as that of the underlapping portion of said elongated fabric and extending substantially thereacross, so that the overlapping outer end and side edges of the overlapping fabric are positioned at an outer end and side edges, respectively, of the scarf;

said overlapping lengths of fabric being secured together or connected at substantially the outer end of the scarf;

the inner end of said first, shorter length of fabric being folded back substantially thereacross with only part of the remaining length thereof to thereby provide a folded, inner end portion;

a length of a first, elongated zipper tape having adjoining outer and inner edges formed of fabric and zipper teeth, respectively; said first zipper tape being associated with and positioned in substantially underlapping relationship with the folded, inner end portion of said first, shorter length of fabric and extending partly or substantially thereacross with its length of zipper teeth positioned inwardly of the adjoining length of the outer side edge of fabric;

the outer side edge of fabric of said first zipper tape and the associated folded, inner end portion of said first, shorter length of fabirc being secured together or connected substantially thereat;

said side edges of said overlapping fabric formed by said elongated fabric and said first, shorter length of fabric being secured together or connected substantially thereat;

a second, shorter length of fabric having outer and inner ends and side edges; said second, shorter length of fabric being positioned substantially contiguous to the inner end of said first, shorter length of fabric, and being positioned in overlapping relationship with only part of the length of said elongated fabric not overlapped by said first, shorter length of fabric, and having substantially the same width as that of the underlapping portion of said elongated fabric and extending substantially thereacross, so that the overlapping side edges of the overlapping fabric are positioned at side edges of the scarf;

the outer end of said second, shorter length of fabric being secured or connected substantially thereat to said elongated fabric overlapped thereby, and said elongated fabric extending outwardly beyond said outer end of said second, shorter length of fabric;

the inner end of said second, shorter length of fabric being folded back substantially thereacross with only part of the remaining length thereof to thereby provide a folded, inner end portion;

a length of a second, elongated zipper tape having adjoining outer and inner side edges formed of fabric and zipper teeth, respectively; said secnd zipper tape being associated with and positioned in substantially underlapping relationship with the folded, inner end portion of said second, shorter length of fabric and extending partly or substantially thereacross with its length of zipper teeth positioned inwardly of the adjoining length of the outer side edge of fabric of said second zipper tape; the length of the zipper teeth of said second zipper tape being substantially coextensive with the length of the zipper teeth of said first zipper tape;

the zipper teeth of said first and second zipper tapes being constructed, positioned and adapted to be placed in operative relationship with each other, so that the zipper teeth of both of said zipper tapes may be selectively and operatively interconnected and disconnected;

the outer side edge of fabric of said second zipper tape and the associated folded, inner end portion of said second, shorter length of fabric being secured together or connected substantially thereat;

said side edges of the overlapping fabric formed by said elongated fabric and said second, shorter length of fabric being secured together or connected substantially thereat;

the lengths of the folded, inner end portions of both said first and second, shorter lengths of fabric extending substantially across the scarf and being constructed, positioned and adapted to be placed in substantially contiguous relationship to each other and, together, to substantially overhang and thereby substantially conceal from view the

zipper teeth of the first and second zipper tapes when those zipper teeth are selectively interconnected;

that portion or portions of the length of the substantially contiguous, folded, inner end portions of both said first and second, shorter lengths of fabric extending outwardly beyond one or both of the outer ends of the interconnectable length of zipper teeth to the associated side edge or edges of the scarf, being secured together of interconnected to each other substantially thereat;

a substantially concealable purse, or pocket thereof, being provided by and within the confines of the overlapping fabric formed by said elongated fabric and first and second, shorter lengths of fabric; said pocket having a selectively closable opening provided by the interconnectable zipper teeth, and through which opening an article may be selectively inserted into and withdrawn from the confines of said pocket; said opening being capable of being opened and closed upon the selective opening and closing of said interconnectable zipper teeth, to thereby selectively open and close said pocket;

said interconnectable zipper teeth being capable of being selectively interconnected by being intermeshed in closed, interlocking relationship and disconnected and opened by being unmeshed in separated relationship; zipper slide member means operatively associated with said interconnectable zipper teeth and being selectively slidable with respect thereto and along a length thereof; said slide member means being constructed and operatively associated with the pair of zipper teeth so as to selectively and alternatively effect the intermeshing and unmeshing of said zipper teeth along at least part of the substantially coextensive length thereof, whereupon said sliding movement of said slide member means causes said slide member means to be selectively and slidably advanced or returned to selectively fasten or unfasten said opening and thereby selectively provide ready access to desired inserted contents of said pocket.

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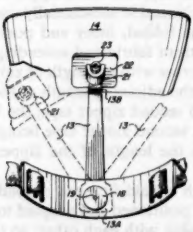
**4,109,322**

## SUN SHIELD

Charlotte A. Ott, 1051 S. Dobson, #65, Mesa, Ariz. 85202

Filed Jun. 9, 1977, Ser. No. 804,911
Int. Cl.[2] A42B *1/18*
U.S. Cl. 2—177 2 Claims



1. A sun shield for providing shade for the head of a wearer comprising:

a substantially flat thin resilient sun shielding member,

an elongated arm member,

a first means for pivotally attaching one end of said arm member to the bottom of said shielding member,

the bottom of said shielding member being provided with a U-shaped clamp for receiving and providing a bearing surface for said one end of said arm member,

a flexible head band having an elastic portion to provide a gripping connection on the head of a wearer, and

a second means for pivotally attaching the other end of said arm member to the side of said head band,

said head band being provided with a resilient arcuate plastic portion to which said second end of said arm member is pivotally attached,

whereby the pivotal movement of said shielding member relative to said one end of said arm member and the pivotal movement of one end of said arm member relative to said head band provides a plurality of shielding positions of said shielding member relative to and spaced from the head of the wearer.

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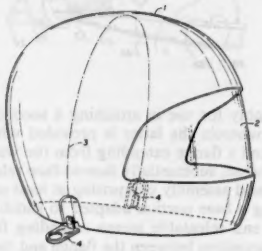
**4,109,323**

## PROTECTIVE HELMET

Jan Henner Matthias, Gries, Pinzgau, Austria, assignor to Porsche Design Ferdinand A. Porsche, Austria

Filed Nov. 30, 1977, Ser. No. 855,659
Claims priority, application Austria, Dec. 7, 1976, 9057/76
Int. Cl.[2] A42B *3/02*
U.S. Cl. 2—410 5 Claims



1. Protective helmet with a helmet shell having at least one separating line thereon, said shell being resistant to mechanical stress and formed of a material resistant to melting over a substantial area thereof, comprising an elongate separating device in the form of an electrical resistor element connected to the helmet shell and extending along said at least one separating line of the helmet shell which consists at least partially of easily meltable material, said separating device being provided with at least two electrical terminals to which an electric current source is connectable.

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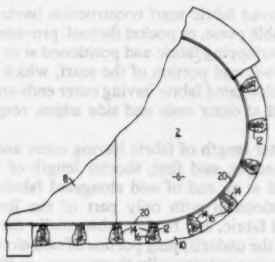
**4,109,324**

## PLASTIC WALL POOL SYSTEM

Kerry J. Cornelius, 22 Springbank Dr., St. Catherines, Ontario, Canada (L2S 2J9)

Filed Jul. 2, 1976, Ser. No. 702,134
Claims priority, application Canada, Apr. 26, 1976, 251059
Int. Cl.[2] E04H *3/16, 3/18*
U.S. Cl. 4—172.19 5 Claims



1. A plastic wall, vinyl liner swimming pool construction comprising:

(a) a plurality of structural foam, injection moulded wall panels detachably connected at their ends to form the shape of a pool construction,

(b) a plurality of hollow X-shaped braces of injection moulded structural foam and filled with a noncompressible material, said wall panels being attached at their tops, centers and bottoms to said braces,

(c) said braces being secured at their lower ends to the perimeter pool construction floor by noncompressible material,

(d) a coping member secured to the upper end of said wall panels,

(e) a vinyl pool liner attached at its upper end to said coping, and

(f) a deck around the upper perimeter of the pool construction,

(g) said wall panels, coping and liner being held in suspension by said X shaped braces and the deck being supported thereby; each said X-shaped brace comprising a pair of injection moulded, structural foam X-shaped members wherein the legs of the X are concave, and flange means on each brace half for abutting like flange means on the other brace half with means interconnecting said flanges and halves together to form hollow legs of the X-shaped brace for reception of a noncompressible material therein; and ribs coplanar with and extending outwardly from said brace at the top, bottom and center thereof for attachment of the pool wall panel to said brace.

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**4,109,325**

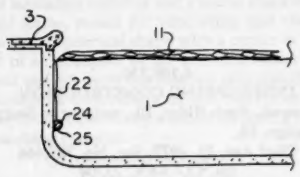
## INFLATABLE SWIMMING POOL COVER SYSTEM

**Gregory Douglas Shuff, 311 Avenida Cerritos, Newport Beach, Calif. 92660**

**Continuation-in-part of Ser. No. 612,846, Sep. 12, 1975, abandoned. This application Dec. 30, 1976, Ser. No. 744,407**

**Int. Cl.[2] E04H *3/19***

**U.S. Cl. 4—172.12** **3 Claims**




1. An air supportable structure for a swimming pool having peripheral side walls, said structure comprising:

a central cover having a floating position and a raised position and made of two sheets of plastic material bonded together to form an air space there between cover is itself buoyant, when inflated said material being configured and dimensioned to closely approximate the configuration and dimensions of the swimming pool and thereby substantially completely cover the swimming pool water surface and float substantially flat upon the said surface in said floating position of said cover;

a peripheral skirt made of sheet material of lesser buoyancy than said central cover and having upper edge margins attached to the edge margins of said cover, said skirt being free of attachment to the structure of said swimming pool whereby, in said floating position of said cover, said skirt extends downwardly in submerged relation below the swimming pool water surface;

ballast means attached to the lower edge margins of said skirt, said ballast means being freely movable upwardly and downwardly in the swimming pool water and of sufficient negative buoyancy to maintain said skirt below the swimming pool water surface in said floating position of said cover; and

means for introducing air beneath said cover at a pressure sufficient to lift said cover to said raised position such that a space is provided between said cover and said water surface sufficient for swimming and recreation, said skirt being located generally above the swimming pool water surface in said raised position, with said ballast means located in the swimming pool water.

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**4,109,326**

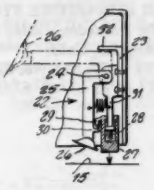
## BATH TUB ENCLOSURE

**Margaret Holt, c/o George Spector, 3615 Woolworth Bldg., 233 Broadway, New York, N.Y. 10007**

**Filed May 4, 1976, Ser. No. 683,171**

**Int. Cl.[2] A47K *3/00***

**U.S. Cl. 4—173 R** **2 Claims**




1. An enclosure adapted to be mounted over a bath tub on a support surface, said enclosure comprising a shell of box-like shape including integral vertical front and opposite side walls integrally joined with a horizontal ledge for enclosing above the upper rim of said bathtub, said ledge having a resilient inner flap along the inner edge thereof, said flap being adapted to bear against the inner side of said bathtub to form a tight seal therebetween, a movable brace mounted on an inner side of said shell and means secured to said shell retaining said brace in an operative position when said shell is not mounted over the tub, and operative to release said brace for movement to a position against a side of the tub when said shell is mounted over said tub, wherein said means comprises a bracket mounted on an inner side of the shell and having a leg extending downwardly with a sleeve mounted slidably thereon, said brace being pivotally mounted on said bracket, coacting hooks mounted on said sleeve and brace serving to retain said brace in said inoperative position, a compression coil spring mounted between said leg and brace, and a spring mounted in said sleeve engaging said leg to bias said sleeve downwardly towards said support surface whereby engagement of said sleeve with said support surface causes an upward sleeve movement to disengage said hooks and release said brace to a position against the side of the tub.

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**4,109,327**

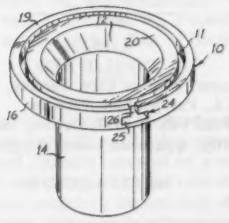
## WATER CLOSET FLANGE WITH CONTINUOUS BOLT SLOT

**Basil B. Jones, Rte. 1, Box 536A, St. Cloud, Fla. 32769**

**Continuation-in-part of Ser. No. 586,161, Jun. 12, 1975, Pat. No. 4,014,053. This application Mar. 22, 1977, Ser. No. 780,068**

**Int. Cl.[2] E03D *11/00***

**U.S. Cl. 4—252 R** **7 Claims**




1. A mounting flange for mounting a water closet, said

mounting flange including a flange having a central opening therethrough, said flange defining a continuous bolt slot, said bolt slot being generally concentric with said opening, said bolt being of a width to receive the bolt portion of a closet bolt and narrower than the base of said closet bolt, said flange further defining a channel beneath and coextensive with said bolt slot and in communication therewith, said channel having a width greater than the narrowest dimension of said base portion of said closet bolt and less than the longest dimension of said base portion of said closet bolt.

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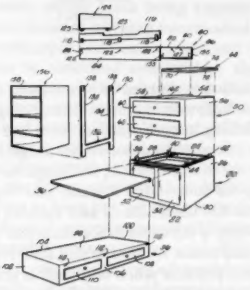
**4,109,328**

## MODULAR FURNITURE SYSTEM

**Lewis M. Mason, Pacific Palisades, Calif., assignor to M & S Industries, Inc., Los Angeles, Calif.**

**Filed Jul. 29, 1977, Ser. No. 820,486**
**Int. Cl.[2] A47B *83/00, 87/00***
**U.S. Cl. 5—2 R** **30 Claims**



1. A modular furniture system comprising:
a plurality of stacked enclosures having an uppermost enclosure;
a plurality of upwardly extending members, each having a first end attached to the inner surface of a lower enclosure and a second end extending upwardly into the volume enclosed by an upper enclosure, said upwardly extending members contracting the inner surfaces of said upper enclosure thereby interlocking said upper and lower enclosures when stacked one on top of the other;
a removable cover for a first top portion of said uppermost enclosure;
an upper rectangular mattress support frame having vertically disposed side walls and end walls;
means for supporting a first end of said upper mattress support frame; and
means for interlocking inner surfaces of said side walls and said end wall of a second end of said upper mattress support frame to a second top portion of said uppermost enclosure so that said upper mattress support frame is supported at said first end by said support means and at a second end by said second top portion of said uppermost enclosure and said removable cover is supported by said first top portion of said uppermost enclosure.

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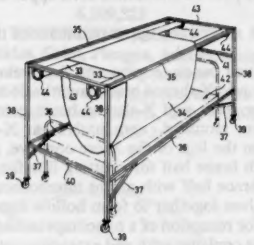
**4,109,329**

## INVALID BED

**Earl Silas Tupper, Panama City, Panama, assignor to TUPI (Panama) S.A., Panama City, Panama**

**Filed Feb. 2, 1977, Ser. No. 764,939**
**Claims priority, application United Kingdom, Feb. 10, 1976, 5197/76**
**Int. Cl.[2] A61G *7/10***
**U.S. Cl. 5—61** **23 Claims**

1. Equipment capable of imparting general relative movement to different parts of the body of a person and overall movement of said body in relation to a support, comprising
(a) a movable frame of a size and configuration sufficient to overlie a hospital bed;
(b) a horizontally mounted rotary drum journalled on said frame;
(c) an endless belt defining in part a loop of flexible material, passing over and hanging beneath said drum from two suspension axes defined in the curved surface of said drum;



(d) said loop being parallel to the longitudinal axis of and wider than the said person is tall in order to accommodate the said person in a lying position; and
(e) drive means mounted on said frame and operatively connected to rotate said drum, whereby the material is moved around in the loop direction and the person is thereby obliged to move within the loop.

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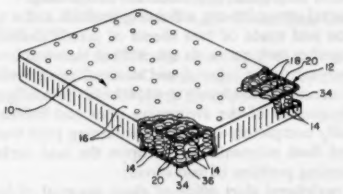
**4,109,330**

## INNERSPRING CONSTRUCTION

**Alvin R. Klancnik, Park Ridge, Ill., assignor to Sealy, Incorporated, Chicago, Ill.**

**Filed Apr. 20, 1977, Ser. No. 789,446**
**Int. Cl.[2] A47C *23/04***
**U.S. Cl. 5—267** **4 Claims**

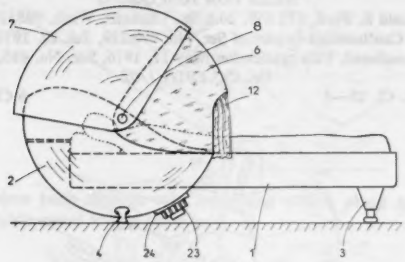


1. In a generally rectangular mattress innerspring unit, a spring structure comprising:
a. a plurality of coil springs positioned in a plurality of parallel rows, said springs each including an upper and a lower terminal convolution which terminal convolutions define an upper and a lower surface of the unit and are disposed in close proximity to the terminal convolutions of adjacent coil springs in the same row;
b. a plurality of cross helicals which extend transversely of the rows of springs in both the upper and lower surface of the unit, and lace together adjacent coil springs in each row; and
c. at least one welding means for restricting the rotation of a cross helical about its major axis, which welding means extends between two adjacent revolutions of a cross helical, whereby cross helical spin-out is reduced.

## 4,109,331
## BED HAVING ACOUSTICAL ISOLATION

André Champeau, 7, rue Pavis de Chavannes, 75007 Paris, France

Filed Nov. 1, 1976, Ser. No. 737,182
Claims priority, application France, Nov. 7, 1975, 75 34169
Int. Cl.[2] A47C *21/04*
U.S. Cl. 5—284 6 Claims




1. A bed comprising a bed frame, means on said frame providing a sleeping surface, said frame having a head end and a foot end, means at said head end of the bed forming a chamber and including first and second parts, said first part being fixed to said frame, said second part being mounted on said first part for movement between an open position in which the second part is retracted on the first part and a closed position in which the second part is extended from the first part and defines a small opening facing the foot end of the frame, said first and second parts being constituted respectively by a rigid frame, and a sound insulating material and a sound absorbent material on said rigid frame, means for ventilating said chamber, said chamber having a spherical shape with a center in the vicinity of the head of an occupant of the bed, and means connecting said first and second parts for relative articulated movement around a horizontal transverse axis, said bed frame comprising a rigid base portion covered by a sound insulating material and a sound absorbing material.

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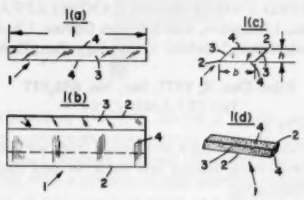
## 4,109,332
## POLYGONAL BODY, CONSISTING OF PLASTICS SOFT FOAM, AS FILLING MATERIAL FOR CUSHIONS OR THE LIKE

Werner Lück, in der Wiese 3, 429 Bocholt, Fed. Rep. of Germany

Filed Jan. 21, 1977, Ser. No. 761,419
Claims priority, application Fed. Rep. of Germany, Jan. 24, 1976, 2602706
Int. Cl.[2] B65D *85/30*
U.S. Cl. 5—337 1 Claim




1. A cushion, pillow, upholstery or the like having a filling comprising a multitude of homogeneous polygonal pieces of plastics soft foam of polyether having a density between 15 and 40 kilograms per cubic meter, wherein each body is in the form of a four sided rod of rhomboidal section longitudinally and transversely, cut from a foam supply in such a manner that all its side surfaces form surfaces of cut, and wherein the height of each body is smaller than the breadth, and the length is in the range of 1¼ times to 5 times the breadth, but not greater than approximately 10 millimeters, said length being approximately 30 millimeters, said breadth being approximately 8 millimeters, and said height being approximately 3 millimeters.

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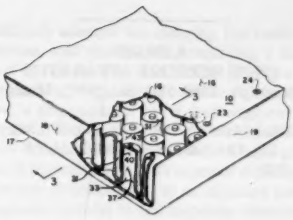
## 4,109,333
## AIR STABILIZED WATER MATTRESS

Thomas George Zmiarovich, Sumnar, Wash., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed Feb. 23, 1977, Ser. No. 771,412
Int. Cl.[2] A47C *27/08*
U.S. Cl. 5—368 1 Claim



1. An inflatable mattress formed with an internal upper chamber and an internal lower chamber, said chambers divided by a shaped internal flexible partition, with the upper chamber bound by the top liner of the mattress and the lower chamber bound by the bottom liner of the mattress, with each chamber provided with independent valve means so that the upper chamber may be filled with water and the lower chamber inflated with air in which the partition is shaped to form a plurality of spaced hollow cylindrical sections extending between the top and the bottom liners of the mattress and spaced from said top and bottom liners, with the interior of said cylindrical sections open to the lower chamber and closed to the top chamber, together with spacer means mounted to the partition to space the cylindrical sections between the top liner and the lower liner.

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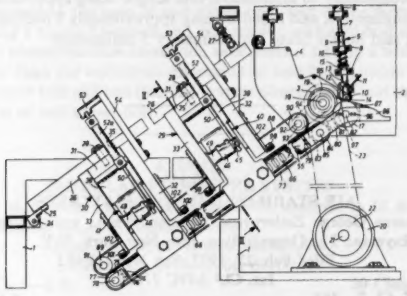
## 4,109,334
## SMOOTHING MACHINE FOR STITCH SEAMS

Heinrich Bungert; Herbert Wenz, and Klaus Wentz, all of Kaiserslautern, Fed. Rep. of Germany, assignors to Pfaff Industriemaschinen GmbH, Fed. Rep. of Germany

Filed May 4, 1977, Ser. No. 793,649
Claims priority, application Fed. Rep. of Germany, May 14, 1976, 2661633
Int. Cl.[2] A43D *11/00*
U.S. Cl. 12—59.5 10 Claims

1. In a machine for smoothing stitched seams on shoe shanks, and of the type including a driven friction wheel, cooperable with a friction wheel rotatably mounted on a relatively elongated support over and along which the shoe shanks are fed, for compressing and smoothing the stitched seams, the improvement comprising, in combination, at least two holding elements mounted on said machine and releasably engageable with said support at supporting points thereon spaced longitu-

dinally of said support; and means operable to disengage said holding elements from said support alternately during the



period between successive seam compressing and smoothing operations.

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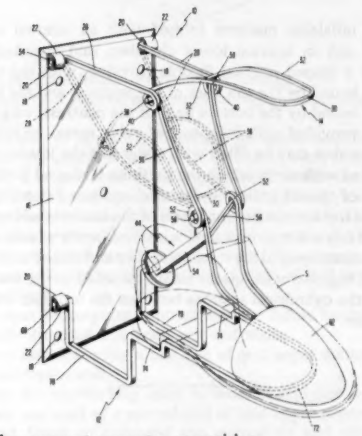
**4,109,335**

## SHOE SUPPORT APPARATUS

**Robert C. Randolph, 2300 19th St., NW., Washington, D.C. 20009**

**Filed Mar. 10, 1977, Ser. No. 776,361**
**Int. Cl.[2] A43D *3/14*; A47L *23/18***
**U.S. Cl. 12—123** **13 Claims**



1. Shoe support apparatus comprising:
base means adapted to be vertically positioned;
shoe support means on said base means for supporting a shoe;
shoe retaining means on said base means for entering and retaining said shoe in an upright position upon said shoe support means;
said shoe support means and said shoe retaining means being pivotably supported on said base means so as to be capable of being alternatively disposed either in a collapsed positioned adjacent the base means or on erected position; and
said shoe retaining means includes a plurality of members pivotally interconnected,
said shoe support means being pivotally mounted for upward movement adjacent the lower portion of said base means;
said shoe retaining means being pivotally mounted for downward movement adjacent the upper portion of said base means;
said shoe retaining means being disposed in an overlying relationship with respect to said shoe support means when disposed in said collapsed position, and means for locking said retaining means in erected position.

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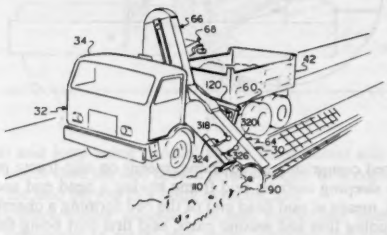
**4,109,336**

## AUTOMATED MACHINERY TO CLEAN DEBRIS FROM ROADSIDE DITCHES, COLLECT IT AND THEN TRANSPORT THE DEBRIS TO A MAJOR COLLECTING AREA FOR DISPOSING

**Donald E. Ford, 672 SW. 20th St., Chehalis, Wash. 98532**

**Continuation-in-part of Ser. No. 490,229, Jul. 22, 1974, abandoned. This application May 11, 1976, Ser. No. 685,367**
**Int. Cl.[2] E01H *1/02***
**U.S. Cl. 15—3** **6 Claims**



1. A ditch cleaning mechanism for mounting on a vehicle to remove, debris from existing roadside ditches, comprising: a base adapted to be fixedly mounted on a vehicle extending transversely of the vehicle; a slide frame structure slidably and controllably positioned on the base, for movement transversely of the vehicle; a cleaning conveyor pivotally mounted at one of its ends on the slide frame structure for movement from an upright position for legal width highway travel to a selectable, variable downwardly extended position of its other end to approach and match the contour of a roadside ditch edge; an auger rotatably mounted on said other end of the cleaning conveyor and driven with the conveyor; a bucket conveyor mounted on said slide frame structure, and positioned during ditch cleaning operations to receive and to further raise the debris being raised by the cleaning conveyor, following the loosening of the debris upon the rotation of the auger along a bottom of a roadside ditch; a debris collecting chamber on said vehicle, and an essentially longitudinal belt conveyor mounted on said slide frame structure operable during ditch cleaning operations to receive the debris from the bucket conveyor and thereafter discharge the debris into said debris collecting chamber.

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**4,109,337**

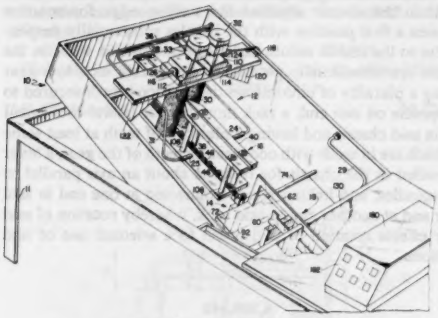
## AUTOMATED TWO-SIDED CLEANING APPARATUS

**Gary Hillman, Livingston, and Michael Devico, Chatham, both of N.J., assignors to Machine Technology, Inc., East Hanover, N.J.**

**Filed Dec. 8, 1977, Ser. No. 858,517**
**Int. Cl.[2] A46B *13/04***
**U.S. Cl. 15—21 D** **14 Claims**

1. Apparatus for moving a workpiece from within a cassette through a processing station and back to said cassette, said apparatus comprising:
a frame, said processing station being mounted on said frame;
a cassette receiving station mounted on said frame for receiving said cassette;
guide means extending from said cassette receiving station through said processing station for receiving an edge portion of said workpiece; and
workpiece moving means for moving said workpiece from

its position within said cassette along said guide means through said processing station and for moving said work-



piece back through said processing station along said guide means to said cassette.

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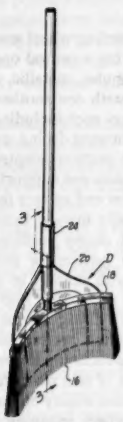
4,109,338

## BROOM AND DUSTPAN COMBINATION

Richard H. Mertes, 26727 Brahms Dr., Westlake, Ohio 44145

Filed Oct. 6, 1975, Ser. No. 619,821
Int. Cl.² A46B 15/00; A47L 13/52
U.S. Cl. 15—105 2 Claims



1. In combination, a broom having a handle and a brush comprised of a concavo-convex array of bristles connected to said handle, and a dustpan adapted to be removably mounted on said broom with a portion of said dustpan positioned adjacent one face of said brush to serve as a backing member for said bristles, said dustpan including mounting means engageable with said broom for permitting said dustpan to be adjustably moved toward and away from the distal ends of the bristles to regulate their effective stiffness, said dustpan being flexible, and in its undeformed condition having a curvature substantially conforming to the curvature of said concavo-convex array.

4,109,339

## TOOTHBRUSH WITH CURVED HANDLE

Ursula Dietrich, 1588 Wedgewood, Hillsborough, Calif. 94010

Filed Sep. 8, 1977, Ser. No. 831,579
Int. Cl.² A46B 5/02
U.S. Cl. 15—167 R 7 Claims

4. A toothbrush adapted for cleaning the teeth of another animal or person, said toothbrush comprising a handle and a head attached to said handle, said handle having a bristle side and including a head segment, a neck segment adjacent said head segment, a grip segment and a shaft segment connecting said grip segment and said neck segment, said neck segment being laterally offset in a double curve from said grip segment along said shaft segment, said shaft segment defining a longitudinal twist in one direction and, at an adjacent portion along said shaft segment, a twist in the opposite direction between said neck segment and said grip segment wherein outer radii of said double curve define banks on said bristle side, said shaft segment further defining a depression on said bristle side adjacent said grip segment adapted to receive a thumb for improving the hand grasp of the brush handle.

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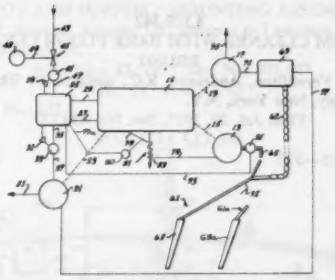
4,109,340

## TRUCK MOUNTED CARPET CLEANING MACHINE

Leonard Eugene Bates, 13928 W. Tahiti Way, #135, Marina Del Rey, Calif. 90291

Filed Jan. 27, 1977, Ser. No. 762,871
Int. Cl.² A47L 11/34
U.S. Cl. 15—321 20 Claims



1. A carpet cleaning machine comprising
an internal combustion engine having a coolant system,
a first pump driven by said engine,
means in operative communication with said first pump for injecting a cleaning fluid into a carpet,
a second pump driven by said engine,
means in operative communication with said second pump for withdrawing dirt from a carpet,
a coolant reservoir in fluid communication with said coolant system in said engine,
means for delivering coolant from at least one of said engine

and said reservoir to said first pump for injection into a carpet by said injection means, and

means for replacing coolant, to at least one of said coolant system and said reservoir, thus delivered to said first pump including

means for adding a cleaning solvent to the coolant thus replaced.

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**4,109,341**

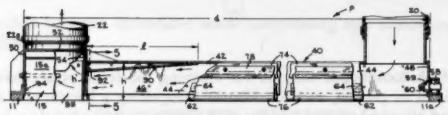
## UNIDIRECTIONAL FLOW PICKUP HOOD FOR STREET SWEEPERS

**Gregory J. Larsen, Claremont, and Jan A. Hiszpanski, Upland, both of Calif., assignors to FMC Corporation, San Jose, Calif.**

**Continuation of Ser. No. 647,305, Feb. 5, 1976, abandoned. This application Aug. 4, 1977, Ser. No. 821,670**

**Int. Cl.[2] E01H *1/08***

**U.S. Cl. 15—340** **12 Claims**



**12.** In a debris pickup system for street sweepers or the like which comprises a vehicle carrying a hopper, blower means for withdrawing air from the hopper, a debris pickup hood having an air inlet duct, and an air outlet line for delivering air and entrained debris from said hood to the hopper; said hood extending laterally of the vehicle and comprising an elongate box-like structure extending laterally of the vehicle, said air inlet duct and said air outlet line being connected adjacent opposite end portions of the hood; the improvement in said hood wherein said hood has top, side and end walls, the interior of said hood cooperating with the swept surface to provide a duct-like air chamber which is substantially unobstructed along its length for chanelling the air from said inlet duct into a substantially unidirectional stream of air from said air inlet duct to said air outlet line, the top wall of said duct-like chamber being inclined downwardly from a zone upstream of said air outlet line to the air outlet line to provide an air deflector for progressively accelerating said unidirectional stream of air and entrained debris as the air stream sweeps the surface and approaches said air outlet line.

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**4,109,342**

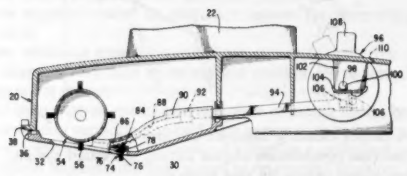
## VACUUM CLEANER WITH BARE FLOOR CLEANING BRUSH

**Don W. Vermillion, Anderson, S.C., assignor to The Singer Company, New York, N.Y.**

**Filed Jul. 29, 1977, Ser. No. 820,177**

**Irt. Cl.[2] A47L *5/30***

**U.S. Cl. 15—373** **3 Claims**



**1.** In a vacuum cleaning apparatus comprising a chassis having a suction nozzle including an inlet mouth having a leading edge and a trailing edge at the bottom of the chassis, means for creating sub-atmospheric pressure at the nozzle inlet mouth, an elongated agitator brush mounted for rotation within the nozzle intermediate the leading and trailing edges, and motor means for rotatably driving the agitator brush, the improvement comprising an elongated bare floor cleaning brush having a multiplicity of bristles supported on a frame, said frame including a spindle at each longitudinal end journalled in the nozzle adjacent the trailing edge for rotation between a first position with the bristles substantially perpendicular to the nozzle mouth and a second position wherein the bristles are substantially parallel to the nozzle mouth, a gear having a plurality of circumferentially spaced teeth secured to the spindle on one end, a rack mounted for lateral movement within said chassis and having a plurality of teeth at least some of which are in mesh with cooperating teeth of the gear, a lever journalled in the chassis for rotation about an axis parallel to said spindles, and linking means connected at one end in said lever and at another end to said rack, whereby rotation of said lever effects rotation of said brush to a selected one of said positions.

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**4,109,343**

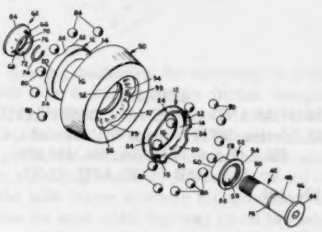
## TROLLEY WHEEL ASSEMBLY

**Siegfried K. Weis, Grand Rapids, and Douglas J. Van der Meulen, Shelbyville, both of Mich., assignors to C. L. Frost & Son, Inc., Grand Rapids, Mich.**

**Filed May 10, 1976, Ser. No. 684,552**

**Int. Cl.[2] E05D *13/02***

**U.S. Cl. 16—98** **19 Claims**



**1.** An antifriction trolley wheel assembly comprising a plastic trolley wheel having a central opening with an axis therethrough; a pair of annular, metallic, outer bearing races positioned back to back with one another in said central opening; said outer bearing races each including an outer surface having an annular, axially inward facing portion, an annular, contoured inner surface portion adapted to receive antifriction bearing means for rotational support of said wheel and outer races, an annular, outer end surface facing axially in a direction opposite to said axially inward facing portion of said outer surface and recessed means positioned axially outwardly of said contoured inner surface for preventing rotation of said outer bearing race with respect to said wheel; said annular, axially inward facing surfaces of said outer races directly contacting and abuttingly engaging one another in said back to back position; said central opening including a central portion having a V-like cross-sectional shape engaging the remainder of said outer surfaces of said outer races except for said abuttingly engaged, annular, axially inward facing surfaces; engaging means on said wheel engaging said outer bearing races including first portions engaging said recessed means for each of said outer bearing races to prevent such rotation and second portions engaging said annular, outer end surfaces of said outer bearing races to prevent axial movement of said outer races away from said back to back position, said engaging means retaining said annular, axially inward facing outer race surfaces in engagement with one another and the remainder of said outer surfaces against said central opening surfaces; axially extending means in said central opening having a pair of inner raceways in registry with the contoured portions of said outer bearing races; and antifriction bearing means disposed between each of said outer bearing races and inner raceways for rotationally supporting said wheel and outer races.

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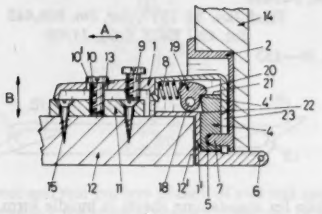
## HINGE WITH CLOSING MEANS

Erich Röck, Höchst, and Bernhard Mages, Dornbirn, both of Austria, assignors to Julius Blum Gesellschaft m.b.H., Hochst, Austria

Filed Jun. 29, 1977, Ser. No. 811,446
Claims priority, application Austria, Jul. 19, 1976, 5286/76
Int. Cl.[2] E05D 11/10
U.S. Cl. 16—144 10 Claims




1. A hinge, particularly for use in hingedly connecting a furniture door to an article of furniture, said hinge comprising:

a hinge arm adapted to be connected to an article of furniture;

a casing adapted to be connected to a furniture door;

a hinge axle pivotally connecting said casing to said hinge arm, such that said casing, and a furniture door adapted to be connected thereto, are pivotable about said hinge axle between an open first position whereat said casing and the furniture door are spaced from said hinge arm, and an article of furniture adapted to be connected thereto, and a closed second position whereat said casing and the furniture door are closely adjacent said hinge arm and the article of furniture;

said casing having extending therefrom a projection;

said hinge arm having freely slidably positioned thereon a sliding device, said sliding device being slidable in a longitudinal direction between a first door-closed position and a second-door-opened position;

said sliding device having therein a recess positioned such that when said casing is in said closed second position thereof said projection of said casing fits into said recess in said sliding device and retains said sliding device in said first door-closed position thereof, such that movement of said casing from said second position to said first position thereof causes sliding movement of said sliding device from said first position to said second position thereof, and such that movement of said casing from said first position to said second position thereof causes sliding movement of said sliding device from said second position to said first position thereof; and

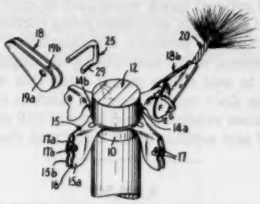
spring biased means acting on said sliding device for retaining said sliding device in said first position thereof when said casing is in said second position thereof, for retarding movement of said sliding device from said first position thereof during an initial portion only of the movement of said sliding device from said first position thereof, for retaining said sliding device in said second position thereof when said casing is in said first position thereof, and for urging said sliding device to said first position thereof during a final portion only of the movement of said sliding device to said first position thereof.

4,109,345

## HINGED BRANCH HOLDER

Harry Sargent, Austin, Tex., and Si Spiegel, Briarcliff Manor, N.Y., assignors to American Technical Institute, Inc., Mount Vernon, N.Y.

Filed Feb. 24, 1977, Ser. No. 771,739
Int. Cl.[2] E05D 1/06, 7/12; A47G 33/06
U.S. Cl. 16—149 4 Claims




1. A hinge assembly for the connection of limbs to the trunk of an artificial tree comprising

a hollow cylindrical retaining collar having a central axis, connecting means to attached said collar to said trunk, a plurality of radial brackets having a first end attached to said collar and a second end surface, said bracket having parallel opposed sides attached to and extend outwardly from said collar and having a bracket aperture extending through said parallel opposed sides, with the axis of said bracket aperture being substantially orthogonal to the axis of said collar,

a plurality of arms for connecting said limbs to said brackets, each of said arms having a first portion forming a U-shaped channel of sufficient width to engage said second end of said brackets,

said first portion having co-axial apertures so located that when aligned with the bracket apertures will insure alignment between said arm and said bracket, said first portion further having a curved end surface, the major portion of which is convex but terminating in a concave segment said concave segment and said second end surface cooperating to form a divergent angle therebetween as said arm is moved in a downward direction,

a second portion adapted to hold said branch,

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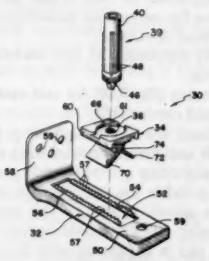
## PIVOT AND SUPPORT MOUNTING ASSEMBLY

Robert E. Strozier, Atlanta, Ga., assignor to Lawrence Brothers, Inc., Sterling, Ill.

Filed May 31, 1977, Ser. No. 801,647
Int. Cl.[2] E05D 7/08
U.S. Cl. 16—151 13 Claims




1. A support assembly for use in a door pivot arrangement for a door, or the like, of the type which includes pintle means carried by said door and engaged with said support assembly, said support assembly comprising; a bracket adapted for mounting relative to a door frame and including elongate

channel means formed therein; a support block mountable to said bracket and including a portion positionable in said channel, said support block including recess means for receiving the pintle means carried by said door; inter-engageable means on said bracket and said support block which when engaged resist relative movement of said support block with respect to said bracket, while permitting said relative movement upon disengagement thereof; and spring means adapted to exert a biasing force on said support block when said support assembly is in the assembled condition, said force being exerted in a direction which will tend to produce disengagement of said inter-engageable means, while maintaining the engagement of said pintle means in said recess means, such that when the force exerted by the door on said support block is relieved, movement of said door relative to said bracket will produce relative movement of said support block along said channel.

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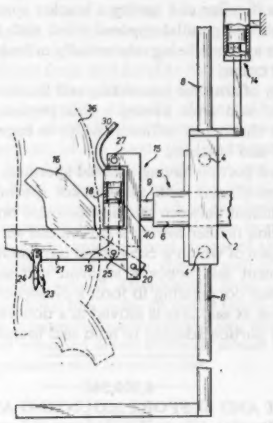
**4,109,347**

## POWER OPERATED APPARATUS FOR SPLITTING CARCASSES OF SLAUGHTERED ANIMALS

**Andre Jolin, Guebwiller, France, assignor to Micarna AG Fleischwarenfabrik, Bazenheid, Switzerland**

**Filed Dec. 30, 1976, Ser. No. 755,543**
**Claims priority, application France, Jan. 8, 1976, 140/76**
**Int. Cl.[2] A22B *5/20***
**U.S. Cl. 17—23** **7 Claims**



1. Apparatus for splitting carcasses of slaughtered animals comprising:

a guiding frame (8) adapted to be located adjacent a suspended carcass to be split;

a carrier (15) supported on said frame (8) and movably mounted thereon for movement including movement in at least a non-vertical direction;

cutting means (16) supported on said carrier and movably mounted thereon;

power-actuated means (18,19,40) for said cutting means (16) supported on said carrier (15),

hand-operable means (9) for manipulating the position of said carrier (15) and thereby said cutting means; and

a downwardly projecting pointed guide pin (23) for said cutting means suitable for introduction into the central opening of the spinal column of the carcass to permit guiding the carrier, and hence said cutting means and said guide pin into, and in alignment with the central opening of the spinal column of the said carcass,

a pair of spaced, essentially parallel vanes (21) projecting from said carrier and secured thereto, each vane being formed with a downwardly directed groove (10) in the surface facing the other vane;

and pivot means (12) pivotably mounted in the grooves of the vanes and connected to the guide pin (23) to secure the guide pin to the vanes for pivotable limited excursion of the vanes to prevent binding of the guide pin in curved portions of the spinal column of a carcass when a guide pin is inserted in the spinal opening of the carcass, and upon movement of the carrier lengthwise relative to the spinal column.

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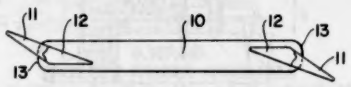
**4,109,348**

## SAFETY CLIPS

**Rune Olsson, Hollviksnas, Sweden, assignor to Produnik AB, Malmo, Sweden**

**Filed Jun. 14, 1977, Ser. No. 806,443**
**Int. Cl.[2] B42F *3/00, 13/06***
**U.S. Cl. 24—153** **3 Claims**




1. A clip for maintaining sheets in bundle form, said sheets having spaced-apart holes formed therein, comprising:

a resilient member movable between a normal planar position and a non-planar flexed position,

a shoulder member extending from a point adjacent each end of said resilient member, and in a direction substantially perpendicular to the plane of said resilient member, said shoulder members each having a sheet-abutting surface,

an end lug connected to each of said shoulder members and extending in a plane parallel to the planar position of said resilient member for insertion into the spaced-apart holes of said sheets upon flexing of said resilient member,

said sheet-abutting surfaces being spaced apart a distance such that they function to pressingly engage the sheet edges forming the spaced-apart holes of said sheets when said resilient member returns to its normal planar position,

each of said end lugs being spaced from said resilient member to define said sheet-abutting surface therebetween for engaging the sheet edges forming the holes of said sheets and thereby maintain the sheets in a stacked relationship, and

said resilient member further including openings formed therein adjacent each end thereof, one of said shoulder members extending from the outer periphery of each of said openings, and said end lugs connected to said shoulder members extending in opposite directions and extending away from each other, said openings being spaced apart a distance substantially equal to the distance of the spaced-apart holes of said sheets, whereby said holes and said openings are in substantial alignment and are adapted to receive fork members extending therethrough, and whereby said resilient member functions as a reinforcement device for said sheets.

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**4,109,349**

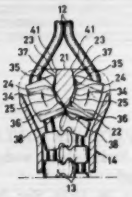
## SLIDE FASTENER

**Akira Tanaka, Kurobe, Japan, assignor to Yoshida Kogyo K.K., Japan**

**Filed Dec. 22, 1976, Ser. No. 753,480**
**Claims priority, application Japan, Dec. 29, 1975, 50-177586[U]**
**Int. Cl.[2] A44B *19/36***
**U.S. Cl. 24—205.11 R** **3 Claims**

1. A slide fastener comprising: a pair of stringer tapes; a pair of series of fastener elements; a slider including a pair of spaced apart upper and lower wings interconnected by a neck located centrally of its front end, which neck has a flat front end, a rounded rear end, a pair of tapered flat front surfaces converging from opposite vertices toward said front end, and a pair of tapered flat rear surfaces converging from said opposite vertices toward and merging into said rear end; and a pair of end

stop members fixedly secured to respective marginal edges of said tapes at their upper ends in opposed relation to each other, each of said end stop members including a solid body of generally rectangular configuration having a top and a bottom flat face and a front and rear flat end face, and recess formed in its inner side and lying between its inner front and rear corners, said recess having an intermediate flat portion and front and rear flat portions spaced apart by and inclined inwardly toward said slider neck with respect to said intermediate flat portion,



said inner front and rear corners of each of said end stop members being rounded, the areas of contact of the pair of end stop members with the slider neck being reduced to a minimum having a gap therebetween when the slider moves into or out of its uppermost position, each end stop body further having a pair of spaced apart rims formed integrally with and projecting from said end stop body throughout the length thereof, said rims being deformable relative to said end stop body from a spread-apart configuration to a compressed-together, substantially parallel configuration to firmly grip said tape edge.

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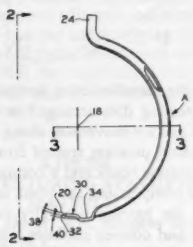
**4,109,350**

## CLAMP BAND

**Leon R. Acre, Ovid, Mich., assignor to Midland-Ross Corporation, Cleveland, Ohio**

**Filed Oct. 7, 1976, Ser. No. 730,671**
**Int. Cl.[2] A44B *21/00***
**U.S. Cl. 24—249 LS** **1 Claim**



1. An arcuate clamp band member cooperable with a like member to form a generally circular clamp band, said member including a longitudinal centerline and having a generally U-shaped cross-sectional configuration and a bottom inside surface lying on the periphery of a reference circle, said U-shaped cross-sectional configuration being defined by a generally flat base portion having legs extending upwardly therefrom, said legs being deformed to lie in a common plane with said base portion at one end portion of said member to define a flat end portion having a terminal end and a width substantially greater than the width of the remainder of said member, said member being integrally formed with interdigitating connecting means for cooperating with corresponding interdigitating connecting means on said like member to form a generally circular clamp band with the bottom inside surfaces of the two members lying generally on the periphery of said reference circle, said interdigitating connecting means cooperating to interconnect the members against displacement along and radially of said reference circle, and including a transverse offset portion spaced inwardly from said terminal end, said offset portion being deformed outwardly to have its inside surface located outwardly of said reference circle a distance slightly greater than the thickness of the material from which said member is formed, a slot in said offset portion extending from one side edge of said flat end portion slightly beyond said longitudinal centerline, and said flat end portion from said slot to said terminal end defining a tongue and said tongue having a length perpendicular to said longitudinal center line which is substantially less than one-half the width of said flat end portion perpendicular to said longitudinal center line.

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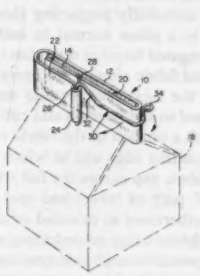
**4,109,351**

## SEALING CLAMP FOR MILK CARTONS AND SIMILAR CONTAINERS

**Darius A. Coffey, 13613 Occidental Ave. South, Seattle, Wash. 98168**

**Filed Jun. 16, 1977, Ser. No. 807,258**
**Int. Cl.[2] A44B *21/00***
**U.S. Cl. 24—258** **3 Claims**



1. A clamp for resealing the top flap of milk cartons or similar containers comprising:

(a) a U-shaped clamp arm having spaced apart parallel legs configured to slideably enclose said top flap;

(b) a squeezing arm attached to the extremity of one of said legs, said squeezing arm being reversely bent around the extremity of the other of said legs extending substantially parallel thereto, and terminating intermediate the ends of the other of said legs;

(c) lever retaining means located on the terminal extremity of said squeezing arm, said lever retaining means including a hollow cylindrical boss;

(d) lever means associated with said lever retaining means movable in a manner for engaging said other of said legs intermediate its ends deflecting it towards said one of said legs;

(e) said lever means including

(1) a pivot rod rotatably journaled within said boss,

(2) said pivot rod having means to limit its longitudinal travel in said boss,

(3) a squeezing rod connected to one end of said pivot rod,

(4) said squeezing rod being configured in a manner to extend between said boss and said other of said legs substantially parallel thereto, when said lever means is in its closed position; and

(f) handle means interconnected to said lever means for moving said lever means between a closed position, wherein said lever means is in engagement with said other of said legs, and an open position, wherein said lever means is disengaged from said other of said legs.

**4,109,352**

## FABRIC CROPPING MACHINE

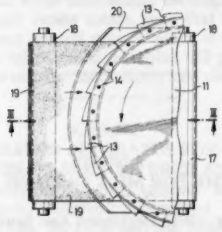
**Fritz Büthe, Viersen, Fed. Rep. of Germany, assignor to Johannes Menschner Textilmaschinenfabrik, Vieren, Fed. Rep. of Germany**

**Filed Mar. 20, 1974, Ser. No. 452,816**

**Claims priority, application Fed. Rep. of Germany, Mar. 23, 1973, 2314557**

**Int. Cl.² D06C *13/00***

**U.S. Cl. 26—15 R** **2 Claims**



1. A machine for cropping or shearing nap of fabrics, comprising a circular disc; means for rotating said disc about the axis of said disc; cutter means secured to the periphery of said disc, radially outwardly projecting therefrom, and having a cutting edge in a plane normal to said axis; and means for guiding an elongated fabric in direction transverse to the width of the elongated fabric along a predetermined path of travel so oriented that the fabric moves into and through a position directly opposed to and beneath said cutting edge of said cutter means in which a portion of the fabric extends parallel to said plane of said cutting edge and in which the cutting edge cuts through the fabric nap across the full width of the fabric, said predetermined path of travel and said plane of said cutting edge being furthermore so oriented relative to each other that an elongated fabric being guided along said path by means for guiding as it passes through said position is generally horizontally disposed with the fabric portion occupying said position being unsupported from below, whereby the presence of knots or bulges on the side of the fabric opposite the side facing the cutting edge will not interfere with the travel of the fabric through said position.

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**4,109,353**

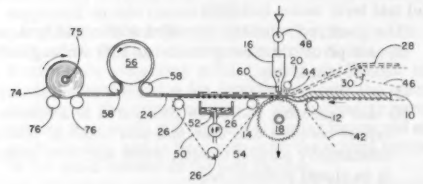
## APPARATUS FOR FORMING NONWOVEN WEB

**Kenneth J. Mitchell, Neenah, and Kurt W. Ostermeier, Harrison, both of Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.**

**Continuation of Ser. No. 675,883, Apr. 12, 1976, abandoned, which is a division of Ser. No. 536,728, Dec. 27, 1974, Pat. No. 3,966,519. This application Jul. 18, 1977, Ser. No. 816,597**

**Int. Cl.² D04H *1/46***

**U.S. Cl. 28—104** **4 Claims**



1. Apparatus for forming a nonwoven web comprising,

a horn adapted to vibrate at high frequencies of up to about 400,000 cps at an amplitude of about 1 to 30 mils;

an anvil forming patterned nip with said horn;

means for delivering a substantially unbonded fibrous base web to said nip;

means for wetting said base web so that the fibers are mobile when subjected to said high frequency vibrations; and

means for drying said web.

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**4,109,354**

## MANUFACTURE OF TAMPONS

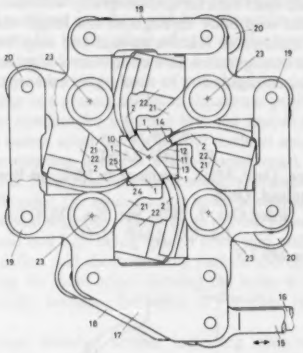
**Marcel Ronc, Zurich, Switzerland, assignor to Karl Ruggli AG, Fisibach, Switzerland**

**Filed May 28, 1976, Ser. No. 691,013**

**Claims priority, application Switzerland, May 30, 1975, 6973/75**

**Int. Cl.² D04H *1/22***

**U.S. Cl. 28—119** **11 Claims**

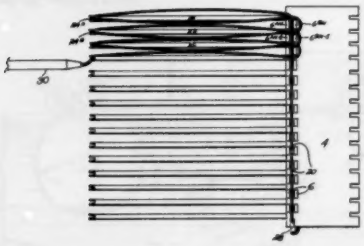


1. A machine for manufacturing tampons, which comprises a plurality of pressing dies arranged as a first set around a common central axis for movement along similar arcuate paths between a separated position spaced from said common axis for receiving a tampon blank and a compression position adjacent said axis for compressing the blank into a shaped tampon, each such first die having generally converging arcuately curved concave and convex surfaces which include therebetween an angle equal to about 360° divided by the number of dies in said first set with these surface curvatures when said first set is in said compression position generally mating respectively with the respectively adjacent convex and concave surfaces of other dies of said set situated on either side to define a narrow arcuately curved gap or slot between the mutually mating surfaces of each adjacent pair of first dies; a cooperating plurality of pressing dies arranged in a second set around said axis for movement within the arcuately curved gaps or slots between adjacent pairs of first dies from a separated to a compression position after the first dies are in their compression position, each die in said second set having opposed concave and convex surfaces mating with the curvatures of the mutually facing surfaces of each pair of first dies which define such gap and terminating at its inner end in a compressing face; separate operating means for moving the dies in each set substantially simultaneously between said positions and independently of the other set, and means for loading a tampon blank into the space between the dies while in a separated position and for ejecting the compressed tampon.

## 4,109,355
## WEAVING SYSTEM, METHOD OF WEAVING AND APPARATUS

Edward Davitian, 575-8 Main St. North, Roosevelt Isl. (NY), N.Y. 10044

Filed Feb. 4, 1977, Ser. No. 765,796
Int. Cl.[2] D03D *29/00*
U.S. Cl. 28—151 10 Claims

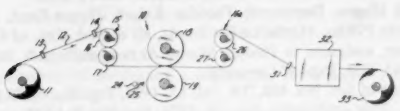


1. Weaving apparatus for individually manipulable single fiber fabrication of woven fabrics comprising:
a weaving holding frame having
a plate like base portion having first and second spaced marginal edges,
a first row of longitudinally spaced lugs extending above the surface of said base portion adjacent said first marginal edge thereof,
a second row of longitudinally spaced lugs extending above the surface of said base portion disposed in adjacent spaced relation to said first row of lugs to define fiber receiving channel therebetween, and
a plurality of elongate rod members having one end thereof terminally mounted in said first marginal edge of said base portion and extending outwardly therefrom, each of said rod members having a fiber containing notch at the unmounted terminal end thereof, and
an elongate weaving wand having a lateral cross-section less than the space between adjacent rod members adapted to feed a fiber from one end and to selectively dispose a weft fiber around, over or under an elongate rod member when positioned such that the longitudinal axis of the weaving wand is substantially parallel to the longitudinal axis of the elongate rod member.

## 4,109,356
## PROCESS FOR TEXTURING SYNTHETIC FIBROUS MATERIAL

Charles P. Mazzone, Dover, N.J., assignor to J. P. Stevens & Co., Inc., New York, N.Y.

Filed Dec. 30, 1976, Ser. No. 757,416
Int. Cl.[2] D02G *1/14*
U.S. Cl. 28—279 12 Claims

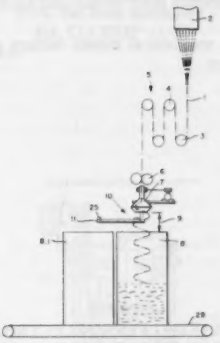


1. A process for texturing a plurality of synthetic fibrous textile materials, which are in the form of yarns or staple fibers, comprising feeding said textile materials between a set of opposed pressure surfaces while heating said textile materials, one of said surfaces being made of nonresilient material having thereon a raised pattern of closely spaced pyramids wherein the tops of the pyramids are truncated or rounded off and the other surface being made of a resilient material having a pattern of pyramid shaped depressions complementary to the pattern of said first surface whereby each of said textile materials is textured in a random sequence of deformations as different portions of the pyramid pattern sequentially act on each of said textile materials, removing said textile materials from between said pressure surfaces and cooling the textile materials to give a textured product having permanent distortions therein.

## 4,109,357
## YARN SEVERING AND HOLDING APPARATUS

Burghard Burow, Radevormwald, and Norbert Klinkert, Solingen, both of Fed. Rep. of Germany, assignors to Barmag Barmer Maschinenfabrik Aktiengesellschaft, Remscheid-Lennep, Fed. Rep. of Germany

Filed Jun. 6, 1977, Ser. No. 803,749
Claims priority, application Fed. Rep. of Germany, Jun. 15, 1976, 2626651
Int. Cl.[2] B65H *54/80*
U.S. Cl. 28—289 6 Claims



1. In a spinning can changing system including a depositing device which rotates about a vertical axis, for depositing continuously fed synthetic filamentary yarn, a plurality of spinning cans and means for horizontally transporting said cans so as to move a full can away from, and an empty can into, an operative position underneath said depositing device,
a yarn severing and holding apparatus, said apparatus including:
an arm horizontally extending between said depositing device and said cans and supported for rotation, independently of the drive of said can transporting means, about a stationary vertical axis disposed outside of the range of rotational movement of the depositing device, and
a slide mounted on said arm for traversing movement lengthwise thereof, said slide carrying a severing device and also a holding device for holding the severed end of the yarn leading toward the full can.

## 4,109,358
## METHOD FOR MAKING STORAGE BATTERY GRID FROM LEAD-TIN-ZINC ALLOY

Joseph C. Duddy, Trevose, and Edward R. Hein, Doylestown, both of Pa., assignors to ESB Ray-O-Vac Management Corporation, Philadelphia, Pa.

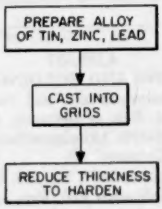
Division of Ser. No. 241,914, Apr. 7, 1972, Pat. No. 4,035,556, which is a continuation of Ser. No. 135,922, Apr. 21, 1971, abandoned. This application Apr. 22, 1977, Ser. No. 790,128
Int. Cl.[2] B23P *15/00, 25/00*
U.S. Cl. 29—2 4 Claims

1. A method for the manufacture of storage battery grids from a lead alloy comprising 0.5 to 2.0% zinc and 0.5% to 2.0% tin, wherein the grids produced have a hardness of at least 50 when tested in a superficial hardness tester with a steel

penetration ball 0.50 inch in diameter and a major load of 15 kilograms, said method comprising:

(a) preparing in liquid form said alloy comprising zinc, tin and lead;

(b) casting an ingot therefrom;




(c) working the cast ingot into sheet form by roll means with the metal remaining at room temperature or below to produce a hardened sheet having said hardness value of at least 50; and

(d) shaping by mechanical means battery grids from the hardened sheet.

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**4,109,359**

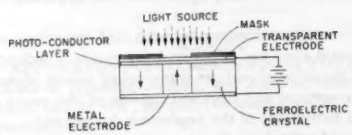
## METHOD OF MAKING FERROELECTRIC CRYSTALS HAVING TAILORED DOMAIN PATTERNS

**Leslie E. Cross, and Robert E. Newnham, both of State College, Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jun. 7, 1976, Ser. No. 693,808**

**Int. Cl.[2] H01L *41/22***

**U.S. Cl. 29—25.35** **1 Claim**




1. In a method for preparing a ferroelectric element having a preselected domain pattern, the steps of

applying an electrode to one face of said element;

applying a photoconductive layer to an opposite face of said element;

superimposing a light transparent electrode over said photoconducting layer;

illuminating said transparent electrode with light energy while maintaining a DC voltage of one polarity across said electrodes thereby to align all of the domains in said element in a common direction;

masking selected areas of said transparent electrode with a light blocking material; and

illuminating said masked transparent electrode with light energy while maintaining a DC bias voltage of an opposite polarity across said electrodes, whereby those portions of the ferroelectric element which are beneath the unmasked portions of said photoconductive layer have domains which are anti-parallel to said common direction.

**4,109,360**

## MACHINE WITH PROCESSING HEADS

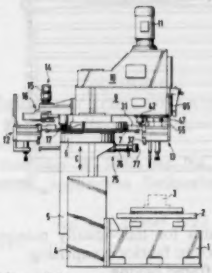
**Hans Hillmann, Hirschgraben 19, D 6603 Sulzbach, Saar, Germany**

**Filed Mar. 10, 1977, Ser. No. 776,429**

**Claims priority, application Fed. Rep. of Germany, Mar. 11, 1976, 2610185**

**Int. Cl.[2] B23B *39/20;* B23Q *3/157***

**U.S. Cl. 29—26 A** **9 Claims**



1. In a machine of the type having a base structure, a carrier rotatably mounted on said base structure, a plurality of processing heads each having a rotatable spindle mounted thereon, means for releasably mounting said heads on and rotatable with said carrier at locations such that the spindles are substantially equally spaced apart, carrier drive means mounted on said base structure and engaging said carrier to rotatably drive said carrier, spindle drive means mounted on said base structure and angularly separated from said carrier drive means, the carrier drive means including means for securing said carrier in a preselected rotational position in which a selected one of said processing heads is located adjacent said spindle drive means such that said spindle drive means can be coupled to a spindle therein by a releasable coupling, the improvement wherein said carrier drive means comprises

a rotatable shaft;

a crank mounted on said shaft for rotation therewith;

a slide member mounted in the plane of said crank, said slide member having means defining a recess shaped to receive said crank in only one rotational position of said crank;

means for supporting said slide member for sliding movement toward and away from said shaft in a plane lying at an angle to the axis of rotation of said shaft; and

means for moving said slide member into receiving engagement with said crank in said one rotational position to thereby fix said crank and said carrier drive means in the preselected rotational position.

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**4,109,361**

## METHOD AND ARRANGEMENT FOR THE PRODUCTION OF ANNULAR ARTICLES

**Albert Hagen, Dortmund; Theodor Kaiser, Hagen-Emst, and Heinz Pöhler, Herdecke-Kirchende, all of Fed. Rep. of Germany, assignors to Hoesch Werke Aktiengesellschaft, Dortmund, Fed. Rep. of Germany**

**Division of Ser. No. 488,718, Jul. 15, 1974, Pat. No. 4,003,121. This application Aug. 18, 1976, Ser. No. 715,325**

**Claims priority, application Fed. Rep. of Germany, Jul. 17, 1973, 2336281**

**Int. Cl.[2] B21K *1/04;* C21D *9/40;* B23P *17/00;* B21H *1/12***

**U.S. Cl. 29—148.4 C** **8 Claims**

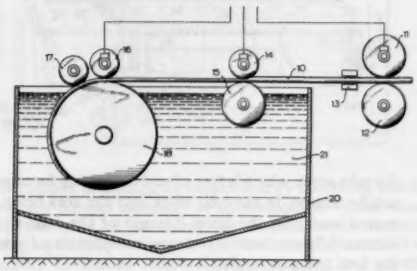
1. The process of making annular articles, particularly wire races for anti-friction bearings, in one continuous operation, the said process comprising, in continuous succession, the following steps:

[1] passing an unshaped blank of a material, adapted to harden upon cooling, through a first heating stage be-

tween a first pair of rollers to form a rolled wire, at least one of said rollers being heated;

[2] passing the rolled wire while still hot through a second heating stage where its temperature is raised to the temperature necessary for shaping the wires;

[3] then passing the hot wire through a second pair of rollers, the said rollers being shaping rollers to impart the desired cross section to the wire, at least one of said rollers being electrically heated so as to maintain the wire at said elevated shaping temperature;



[4] thereafter passing the wire through the nib between at least one guide roller and a disk-like coiling member, the said guide roller being electrically heated so as to continue maintaining said wire at said elevated temperature;

[5] coiling said wire about the rim of said disk-like member so as to obtain a series of convolutions of desired diameter;

[6] chilling said coiled wire so as to obtain a hardened member consisting of a plurality of convolutions, and

[7] subdividing the hardened coiled member so as to obtain annular articles of desired width.

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**4,109,362**

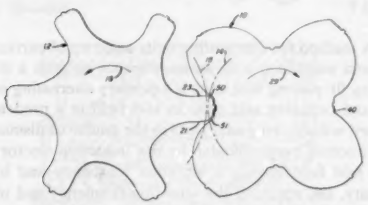
## METHOD OF MAKING SCREW ROTOR MACHINE ROTORS

**Robert A. Ingalls, Springfield, Vt., assignor to Joy Manufacturing Company, Pittsburgh, Pa.**

**Division of Ser. No. 645,981, Jan. 2, 1976, Pat. No. 4,053,263, which is a continuation of Ser. No. 374,032, Jun. 27, 1973, abandoned. This application Apr. 27, 1977, Ser. No. 791,366**

**Int. Cl.[2] B23P *15/00***

**U.S. Cl. 29—156.4 R** **8 Claims**



1. A method of producing a male rotor for a screw rotor machine comprising:

hobbing a rotor blank to produce an elongated formed male rotor rotatable about a central longitudinal axis and having a pitch circle centered on such axis and a plurality of elongated helical lobes extending longitudinally of said rotor and circumferentially spaced about said pitch circle so as to provide intervening grooves therebetween with a major portion of each of said lobes extending generally radially outward from such pitch circle with the profile of each of said lobes in a plane perpendicular to such axis having a tip portion and respective generally convex leading and trailing flank portions extending intermediate said tip portion and the root portion of the respective adjacent groove; and

forming of said hobbing process the profile of said leading flank portion of involute curvature extending between said respective root portion and an intermediate point and traversing said pitch circle, and a circular arc portion extending between said intermediate point and said tip portion with said circular arc portion formed of at least two circular arcs of different radii, and the profile of said trailing flank consisting of involute curvature extending between the other of said respective root portions and said tip portion and traversing said pitch circle.

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**4,109,363**

## SINGLE PISTON OPERATED CLIP DEVICE

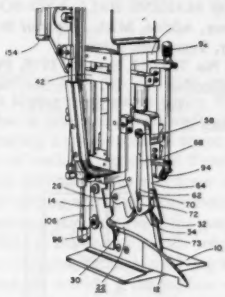
**Clyde R. Velarde, Raleigh, N.C., assignor to Rheem Manufacturing Company, New York, N.Y.**

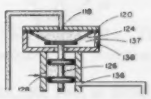
**Division of Ser. No. 565,581, Apr. 7, 1975, Pat. No. 4,004,339. This application Jul. 19, 1976, Ser. No. 706,932**

**The portion of the term of this patent subsequent to Jan. 25, 1994, has been disclaimed.**

**Int. Cl.[2] B23P *11/00***

**U.S. Cl. 29—243.56** **4 Claims**





1. In a clipper mechanism of the type including a main fluid actuated drive cylinder for operating a clip punch and a separate fluid actuated knife cylinder for operating a cut-off knife, the improvement comprising:

cylinder control means including a single input fluid source to the opposite ends of said cylinders,

said control means further including a two position main pilot valve, having

a first normally pressurized position whereby pressurized fluid is directed from the source through a first outlet of the main pilot valve by parallel connections to the drive cylinder and the knife cylinder to maintain said cylinders in the punch retracted position and knife unoperated position respectively, and

and a second pressurized position whereby the first outlet is exhausted and fluid is directed from a second outlet of the main pilot valve to the opposite end of the drive cylinder and by a separate parallel connection from the source to the opposite end of the knife cylinder to drive the drive cylinder to a punch extended position and the knife cylinder to the knife operated position respectively, said separate parallel connection from the source to the knife cylinder including a pilot operated knife control valve having a control inlet responsive to the outlet signal of a time delay diaphragm valve, said time delay diaphragm valve having a control port in parallel with the first position of said two position main pilot valve to positively maintain the diaphragm valve in a no outlet signal position during the first normally pressurized position of said two position pilot valve, said diaphragm valve also including restricted orifice time delay means for controlling the time of operation of the diaphragm valve and the outlet signal to the knife control valve when said two position main pilot valve is moved to the second pressurized position, whereby the knife cylinder operation is time delayed.

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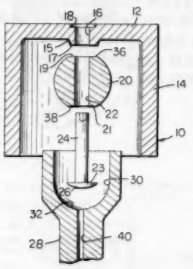
**4,109,364**

## METHOD OF MAKING BALL AND SOCKET JOINT

**Ronald R. Wisner, Adrian, Mich., assignor to Tecumseh Products Company, Tecumseh, Mich.**

**Division of Ser. No. 723,013, Sep. 13, 1976, Pat. No. 4,070,122.**
**This application Jun. 20, 1977, Ser. No. 807,808**
**Int. Cl.[2] B23P *15/10***
**U.S. Cl. 29—156.5 R** **3 Claims**




1. The method of connecting a piston having a top wall and a skirt to a connecting rod by a ball and socket joint which comprises: forming a ball receiving socket in the end of the rod, placing a ball in the socket and deforming the socket in the end of the rod inwardly about a portion of the ball to hold the ball swivelly captive in the socket, and then connecting the ball to the underside of the top wall of the piston by using a separate fastener.

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**4,109,365**

## METHOD FOR FORMING CONTOURED TUBING

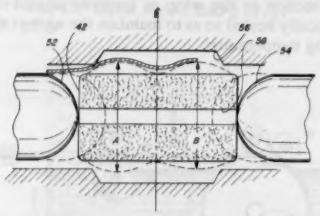
**Robert Carl Tygart, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Mar. 30, 1976, Ser. No. 671,761**
**Int. Cl.[2] B23P *17/00*; B21D *9/05***
**U.S. Cl. 29—421 R** **8 Claims**

1. A method of forming tube stock into a tube having a contoured shape, comprising the steps of:

applying a deforming force to said tube stock in one portion of the area to be contoured while the remainder of the tube stock is free of said deforming force; and

moving the deforming force incrementally along the longitudinal axis of the tube stock through the area to be contoured to form the contoured shape while that portion of




the tube stock which is free of said deforming force moves axially relative to the tube stock into the area being contoured such that the hoop strength of the tube stock is substantially retained in the area immediately adjacent to the area being deformed.

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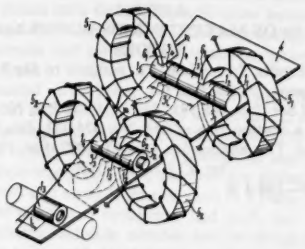
**4,109,366**

## METHOD OF DISMANTLING UNITS

**Benyamin Alexandrovich Ioffe, ulitsa Stirnu, 37a, kv. 44, and Robert Karlovich Kalnin, ulitsa Gorkogo, 53, kv. 19, both of Riga, U.S.S.R.**

**Filed May 11, 1976, Ser. No. 685,356**
**Int. Cl.[2] B23P *19/02***
**U.S. Cl. 29—427** **4 Claims**



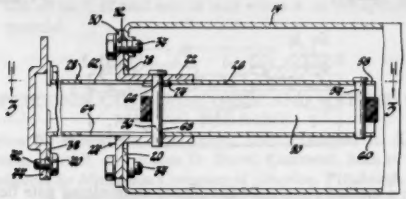
1. A method for dismantling units made up of current-carrying parts assembled with an interference or with a sliding or running fit: placing said units in a primary alternating magnetic field and orienting said units in said field in a predetermined manner, withdrawing said parts in the course of dismantling in the direction perpendicular to the induction vector of said field, said field having a vibration frequency and induction intensity, and applying the vibration frequency and induction intensity of said field sufficient for creating forces stronger than the forces of cohesion between said parts in a unit being dismantled, the energy generated by the primary magnetic field providing electrodynamic forces for dismantling said units, said forces forming from simultaneous current induction in parts to be separated from each other, the magnetic field having a direction so that current induced in the parts to be separated is distributed so that a separating line formed by said electrodynamic forces due to interaction of magnetic fields in the parts with said primary magnetic field has the greatest density, the forces applied to each said parts being directed opposite to each other, said parts being substantially free of deformation by said forces, said forces being axial forces.

4,109,367

## METHOD OF MANUFACTURE ENERGY ABSORBER

Raymond L. Richard, Jr., Port Clinton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 746,421, Dec. 1, 1976, Pat. No. 4,046,411.
This application Jun. 17, 1977, Ser. No. 807,515
Int. Cl.[2] B23P *19/00*
U.S. Cl. 29—436 2 Claims



1. A method of making an impact energy absorbing unit for mounting a bumper assembly to an automotive vehicle comprising the steps of providing flat metallic stock material, blanking a generally rectangular part out of said flat stock with a plurality of spaced longitudinally extending and parallel straps on one end thereof, forming a pair of parallel notches in the other end of said part, forming a pair of laterally spaced slots in the flat stock in a side by side location, rolling the flat stock into a cylindrical body until the side edges thereof are adjacent to one another and said slots are in alignment with each other, joining said edges to one another, bending said straps formed at one end in said flat stock outwardly of said cylindrical body, providing a bracket surrounding said cylindrical body and inserting a pin through said bracket and through one end of said slots in said body, providing a pin for said notches extending across one end of said body, mounting a yieldable band around said pins to thereby provide a yieldable energy absorber unit for yieldably supporting said bumper to said vehicle.

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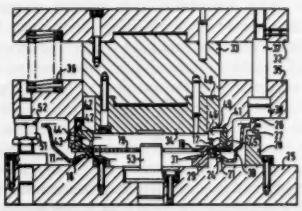
4,109,368

## METHOD OF ASSEMBLING A SUB-ASSEMBLY OF A DIAPHRAGM SPRING FRICTION CLUTCH

William Ernest Hubbard; Robert Hyde, and Peter Frederick Crawford, all of Leamington Spa, England, assignors to Automotive Products Limited, Leamington Spa, England

Filed Oct. 22, 1976, Ser. No. 735,082
Claims priority, application United Kingdom, Jul. 14, 1976, 29199/76
Int. Cl.[2] B23P *11/02*
U.S. Cl. 29—446 7 Claims



1. A method of assembling a sub-assembly of a diaphragm spring friction clutch, the components of the sub-assembly comprising a cover, a diaphragm spring having a plurality of radially inwardly directed fingers and which is to be supported by the cover adjacent the radially outer ends of the fingers, the diaphragm spring being conically dished when in its relaxed state, a fulcrum ring which is to be located on the opposite side of the diaphragm spring to the cover, and a plurality of tabs which, before the assembly, extend from the cover in a direction substantially parallel to the axis of the spring, the method including the steps of assembling the diaphragm spring and said fulcrum ring, flattening the diaphram spring, thereby moving the peripheral rim of the spring relative to the cover against the load of the spring, and bending each tab radially outwards by a forming tool over the adjacent arc of the fulcrum ring to support the diaphragm spring on the cover while simultaneously supporting, against radially inward movement, each tab where it extends through the diaphragm spring and, against radially outward movement, each of said arcs of the fulcrum ring.

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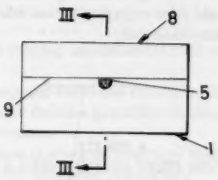
4,109,369

## METHODS OF JOINTING OPTICAL FIBRES

John Edward Taylor, Cookham, England, assignor to BICC Limited, London, England

Filed Feb. 20, 1975, Ser. No. 551,341
Claims priority, application United Kingdom, Feb. 21, 1974, 7964/74
Int. Cl.[2] B23Q *3/00;* G02B *5/14*
U.S. Cl. 29—467 14 Claims




1. A method of effecting a joint between two optical fibres which comprises laying on a substantially flat surface of a metallic body that is soft and substantially non-resilient an elongate gauge having a cross-sectional shape and size corresponding to that of each of the optical fibres to be jointed; pressing the gauge into said surface to form in, and between two edges of, the surface a groove of a substantially complementary cross-sectional size; removing the gauge and aligning the two optical fibres in the groove so that neighboring ends of the optical fibres substantially abut; applying to said grooved surface a second body having a flat surface so that the flat surface of said second body is in interfacial contact with the grooved surface; and securing the two bodies together.

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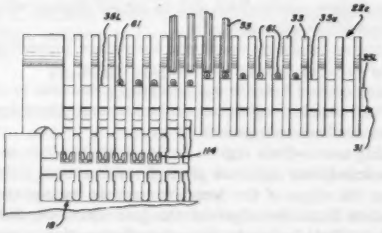
4,109,370

## WIRE TERMINATING TOOL

James R. Quigley, Lombard, Ill., assignor to TRW Inc., Elk Grove Village, Ill.

Division of Ser. No. 656,580, Feb. 9, 1976, Pat. No. 4,047,294.
This application Jun. 17, 1977, Ser. No. 807,364
Int. Cl.[2] H01R *43/04*
U.S. Cl. 29—566.3 23 Claims



1. In an apparatus for effecting solderless termination of a plurality of wires in a connector of the type having a plurality

of channel-shaped recesses, each of said recesses having a wire-engaging terminal disposed therein, the combination comprising first means for supporting a plurality of wires in predetermined, spaced relationship; means for supporting such connector in a position relative to such supported wires whereby each of said wires is disposed in adjacent relationship opposite a channel-shaped recess of said connector; stuffing means for engaging all of said supported wires and for driving the same into said connector recesses into engagement with the terminals therein; said first means including a plurality of wire-guiding channels disposed in alignment above said connector channels in the normal position of apparatus operation; said first means also including a wire shearing edge disposed adjacent the distal ends of said connector channels in substantially the same plane therewith when such connector is located in the supporting means; the wire engaging means having shear edge portions which cooperate with said shearing edge whereby said wires are sheared substantially flush with the connector channel distal edges in the course of being driven into engagement with said connector terminals; said shearing edge having a configuration for effecting a shearing relation with said shear edge portions of said wire-engaging means whereby such wires are not sheared simultaneously.

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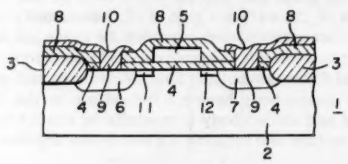
**4,109,371**

## PROCESS FOR PREPARING INSULATED GATE SEMICONDUCTOR

**Hiroshi Shibata, and Tsutomu Yoshihara, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 30, 1976, Ser. No. 755,943**
**Claims priority, application Japan, Jan. 6, 1976, 51-983**
**Int. Cl.² B01J *17/00***
**U.S. Cl. 29—571** **3 Claims**




1. A process for preparing an insulated gate semiconductor which comprises the steps of:

forming a gate electrode on an insulating membrane on a semiconductor substrate;

forming auxiliary regions for shallow source-drain regions having conductive type being opposite to that of said semiconductor substrate in said semiconductor substrate by using said gate electrode as a mask so that the edges of the shallow source-drain regions are self-aligned with the edges of the gate electrode;

forming an insulating membrane for surface protection on said auxiliary regions and said gate region;

forming contact holes in said insulating membrane to reach to said auxiliary regions at positions separated by a desired distance from said gate electrode;

forming source-drain regions having deep junctions in said semiconductor substrate through said contact holes so that the edges of the deep source-drain regions are displaced from the edges of the gate electrode and the contact holes, whereby the source-drain regions comprise a deep part and a shallow part; and

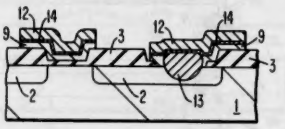
bonding electrode metals to each region in each contact hole.

**4,109,372**

## METHOD FOR MAKING AN INSULATED GATE FIELD EFFECT TRANSISTOR UTILIZING A SILICON GATE AND SILICIDE INTERCONNECTION VIAS

**Robert Michael Geffken, Burlington, Vt., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed May 2, 1977, Ser. No. 793,231**
**Int. Cl.² B01J *17/00***
**U.S. Cl. 29—571** **9 Claims**




1. In a method for the fabrication of an insulated gate field effect transistor, the steps comprising:

(a) providing a semiconductor substrate of first conductivity type having therein spaced apart diffusions of a second conductivity type forming a gate area therebetween and having superimposed on said structure a dielectric layer;

(b) providing contact holes spaced from said gate area through said dielectric layer and selectively depositing a silicide forming metal therein;

(c) selectively depositing a polycrystalline silicon layer in said gate area between said diffusions on said dielectric layer and upon said selectively deposited silicide forming metal;

(d) depositing a metallic interconnection layer on said polycriptalline silicon layer; and

(e) heating said structure to an elevated temperature to form a conductive metallic silicide contact between said substrate and said metallic interconnection layer.

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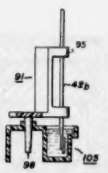
**4,109,373**

## METHOD FOR MANUFACTURING SEMICONDUCTOR DEVICES

**Donald W. Fennessy, Liverpool, and Harry W. Schmitz, Glens Falls, both of N.Y., assignors to General Electric Company, Auburn, N.Y.**

**Continuation of Ser. No. 556,824, Mar. 10, 1975, abandoned, which is a division of Ser. No. 449,550, Mar. 8, 1974, Pat. No. 3,941,532. This application Jun. 1, 1976, Ser. No. 691,241**
**Int. Cl.² B29C *6/00*; H01L *21/58, 21/60***
**U.S. Cl. 29—588** **3 Claims**




1. A method for the manufacture of semiconductor devices wherein a first substantially rigid lead frame is utilized during a first manufacturing operation and a second, resiliently-connected lead frame is utilized during a second manufacturing operation, comprising:

mounting a plurality of sets of lead wires in a rigid primary lead frame;

simultaneously aligning all of said sets of lead wires with a first plurality of work stations by aligning said rigid primary lead frame with said work stations;

mounting a semiconductor device on each of said sets of lead wires and providing electrical connections among said lead wires and said device;

transferring said plurality of sets of lead wires to a segmented lead frame comprising a plurality of separate lead-receiving elements each of which receives one of said sets of lead wires and is resiliently connected with the other ones of said elements;

independently aligning each of said lead-receiving elements with a plurality of second work stations; and

encapsulating said semiconductor pellets and at least a portion of each of said sets of lead wires in an encapsulating material.

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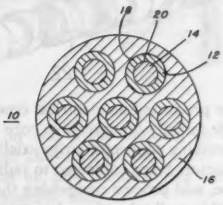
**4,109,374**

**SUPERCONDUCTOR COMPOSITE AND METHOD OF MAKING THE SAME**

**Clayton N. Whetstone, San Diego, Calif.; Douglas A. Koop, Lower Burrell, and James D. Dowd, Oakmont, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.**

**Filed Aug. 28, 1975, Ser. No. 608,633**
**Int. Cl.[2] H01V *11/00***
**U.S. Cl. 29—599** **25 Claims**




1. A method of producing a worked superconductor composite comprising a plurality of individually stabilized superconductor elements in a normally resistive matrix, said method comprising the steps of

(1) providing a composite working stock comprising an aluminum alloy matrix metal said alloy consisting essentially of at least 1% of alloying additions selected from the group consisting of up to 3% Si, up to 6% Cu, up to 2% Mn, up to 10% Mg, up to 10% Zn, up to 0.5% Cr, up to 2% Fe, Ni or Co, balance substantially aluminum and incidental elements and impurities, said aluminum alloy matrix having a substantially high electrical resistivity of $10^{-7}$ ohm-cm or more at superconducting temperatures said aluminum alloy matrix metal being in the form of workable stock, said aluminum alloy matrix metal having situated therewithin a plurality of spaced substantially parallel elongate tubes of a workable metal superconducting at superconducting temperatures and, situated within said elongate tubular superconductor tubes, stabilizing cores of substantially pure aluminum having an electrical resistivity of $10^{-8}$ ohm-cm or less and substantially greater than the superconductor tubes but substantially less than the matrix metal at superconducting temperatures, the respective metals for said matrix and superconductor tubular members being selected such that the initial ratio of the flow stress between superconductor and matrix is 8 or less which said flow stress ratio is maintainable at said level of 8 or less substantially throughout metal working operations whereby the superconductor tubes and matrix are laminarly co-reducible by metal working operations:

(2) subjecting said composite working stock to at least one metal working procedure to reduce its cross-sectional area and elongate its length to a substantial extent, said working procedure being conducted so as to favor laminar flow conditions and maintain said flow stress ratio at said level of 8 to 1 or less to uniformly co-reduce said composite stock and each member within said composite stock to provide a superconducting composite body having said stabilizing core members, said superconductor tubular members and said resistive matrix all substantially proportionally reduced in cross sectional size and intimately bonded together.

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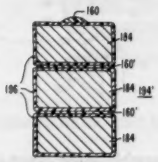
**4,109,375**

**METHOD OF MAKING ADHESIVE COATED ELECTRICAL CONDUCTORS**

**Kou Chi Lin, Hickory, and Edmund E. Woods, Sharon, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Nov. 22, 1976, Ser. No. 743,828**
**Int. Cl.[2] H01F *7/06***
**U.S. Cl. 29—605** **8 Claims**




3. A method of making an electrical coil, comprising the steps of:

providing an elongated electrical conductor having a plurality of sides which define a generally rectangular cross-sectional configuration,

applying a resinous coating of electrical insulating material to all sides of the electrical conductor,

heating said resinous coating above a predetermined first temperature to solidify it,

providing finely divided particles of an adhesive which are heat fusible at the first temperature,

directing the particles of adhesive against only a selected side of the electrical conductor while the solidified resinous coating is above the first temperature to fuse the particles and provide a coating of adhesive on the selected side having a predetermined thickness dimension and a width dimension which is less than the width of the selected side,

winding said electrical conductor into a coil having a plurality of adjacent conductor turns, with the adhesive coating being between said conductor turns,

softening said coating of adhesive while providing pressure between the conductor turns to reduce the predetermined thickness dimension of the coating of adhesive and provide a spacing between adjacent conductor turns which is less than the predetermined thickness dimension of the coating of adhesive,

and solidifying the coating of adhesive to bond the adjacent conductor turns together.

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**4,109,376**

**METHOD OF MANUFACTURING A CIRCUIT BREAKER ASSEMBLY OR THE LIKE**

**Ronald C. DiLiddo, Kettering, and Dallas E. King, Dayton, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.**

**Filed Jun. 24, 1977, Ser. No. 809,565**
**Int. Cl.[2] H01H *11/00***
**U.S. Cl. 29—622** **5 Claims**

1. The method of making a circuit breaker assembly or the like comprising the steps of:

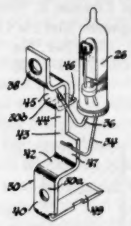
providing an insulator housing having a cavity defined in part by shelf means and a slot,

providing a one piece sheet metal terminal shaped to include spaced portions adapted to rest on spaced locations of the shelf means located across the slot from each other and a severable web between said spaced portions,

providing an electrical device which fits in a portion of the

cavity deeper than the cavity portions defined by the shelf means and which has a pair of wire like leads,

forming a subassembly by permanently securing the pair of wire like leads to respective portions of the terminal located on opposite sides of the thin severable web from each other,



securing the subassembly in the cavity of the insulator housing with the terminal supported on the shelf means and the severable web overlying the slot, and

severing the web and bending at least a portion thereof downwardly into the slot to separate the terminal into two terminal pieces and provide a conductive path comprising one of the terminal pieces, the electrical device and the other of the terminal pieces in a series arrangement.

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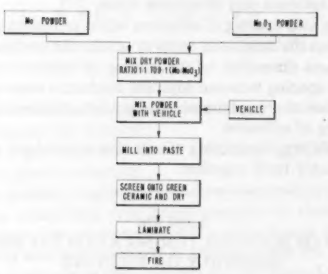
**4,109,377**

## METHOD FOR PREPARING A MULTILAYER CERAMIC

**Linda Ann Blazick, Newburgh, and Lewis Franklin Miller, LaGrangeville, both of, NY, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Feb. 3, 1976, Ser. No. 654,686**
**Int. Cl.² H05K *3/30, 3/00***
**U.S. Cl. 29—626** **16 Claims**




1. In a method for preparing a multilayer ceramic for carrying semiconductor chips comprising:

depositing a particulate mixture of a metal and a metal oxide thereof in the ratio of between about 1:1 to 9:1 in a pattern on at least a portion of unfired ceramic layers;

said metal having high conductivity and a thermal expansion coefficient closely matched to said ceramic;

drying said pattern;

laminating the said plurality of layers of ceramic at a pressure greater than about 2500 pounds per square inch;

firing the laminate at an elevated temperature in a non-oxidizing atmosphere; and

cooling the resulting said multilayer ceramic to room temperature.

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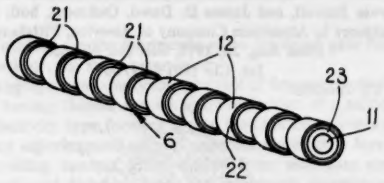
**4,109,378**

## METHOD OF MAKING AN ELECTRICAL CONNECTOR

**Dennis Davies, Marple, England, assignor to International Computers Limited, London, England**

**Filed May 3, 1977, Ser. No. 793,337**
**Claims priority, application United Kingdom, May 15, 1976, 20148/76**
**Int. Cl.² H01R *43/00***
**U.S. Cl. 29—629** **5 Claims**




1. A process for producing an electrical connector element including a flexible radially compressible core and a plurality of spaced circumscribing connector strips axially spaced along the core the connectors being subjected to radial compressive forces when in use, said process comprising the steps of

(a) providing a thin wall tube of predetermined spring characteristics; the tube having inner and outer cylindrical surfaces each with close diametrical dimensional tolerances;

(b) introducing a mandrel into the interior of the tube so as to be effectively co-axial with the tube thereby to define an annular space between the inner cylindrical surface of the tube and the mandrel;

(c) filling said annular space with a material which is curable to provide a core of an elastomeric material with predetermined compression characteristics;

(d) causing the material to cure in such manner as to ensure that the material does not adhere to the mandrel but bonds to the tube inner surface during curing whereby any radially directed tension forces produced during curing are relieved by radial contraction of the material away from the mandrel;

(e) removing circumferential strips of tube material to leave said spaced parallel conductive strips bonded to the core; and

(f) removing the mandrel from the core.

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**4,109,379**

## MANIPULATOR FOR THE INSERTION AND EXTRACTION OF PRINTED-CIRCUIT BOARDS INTO AND FROM A HOLDER THEREFOR

**Franco Ratti, Milan; Gianantonio Vivarelli, Cesano Boscone; Dario Maganza, Cornaredo, and Emanuele D'Amore, Milan, all of Italy, assignors to Societa Italiana Telecommunicazioni Siemens S.p.A., Milan, Italy**

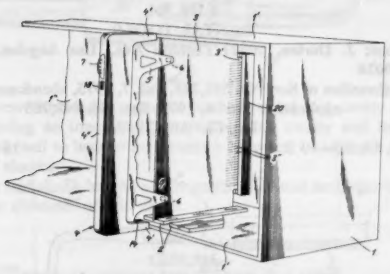
**Filed Jul. 6, 1977, Ser. No. 813,229**
**Claims priority, application Italy, Jul. 7, 1976, 25079 A/76**
**Int. Cl.² H05K *3/30;* B25B *27/14***
**U.S. Cl. 29—747** **10 Claims**

1. A manipulator for facilitating insertion of a printed circuit board into a holder and subsequent extraction of said board from the holder, the latter having a pair of parallel sidewalls forming guide tracks for respective lateral board edges and further having stationary connectors engageable by coacting connectors on a transverse edge of the inserted board, comprising:

a generally C-shaped frame having a ridge positionable at

right angles to said sidewalls in line with a printed-circuit board to be inserted or extracted, said frame further having a pair of legs transverse to said ridge adapted to come to rest on exposed edges of said sidewalls;

a slider received in said frame between said legs, said slider being provided with lug means pointing to the interior of said container upon a positioning of said legs on said exposed edges, said lug means carrying a gripping formation engageable with a mating formation on the associated printed-circuit board;



stop means on said frame defining an extended position remote from said ridge for said slider;

biasing means on said frame urging said slider into said extended position; and

latch means on said frame for selectively locking said slider in said extended position to facilitate the insertion of the associated printed-curcuit board, said slider being withdrawable from said extended position upon deactivation of said latch means for disengaging the connectors of said board from respective connectors of said holder preparatorily to complete extraction of the board from the holder.

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**4,109,380**

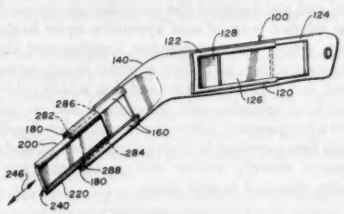
## CUTTING TOOL AND BLADE HOLDER FOR REPLACEABLE BLADES

**Lloyd E. Anderson, 6408 74th Ave. N., Brooklyn Park, Minn. 55428**

**Continuation-in-part of Ser. No. 812,587, Jul. 5, 1977, abandoned. This application Jan. 23, 1978, Ser. No. 871,352**

**Int. Cl.[2] B26B *5/00***

**U.S. Cl. 30—162** **29 Claims**



1. Blade holder adapted to use a replaceable blade, comprising:

(a) body receiving means for slidably receiving blade to be used with the holder; and

(b) edge receiving means for receiving the top and bottom edges of at least a portion of the blade, the means being sized on the order of the edge width but narrower than the blade width whereby the blade is held by the edge receiving means as a cutting edge of the blade engages an object to be cut due to the wedging of the blade body into the edge receiving means.

**4,109,381**

## HYDRAULIC SECATEURS

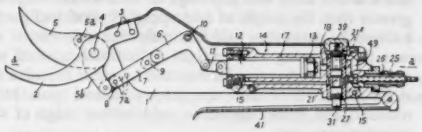
**Roger Joseph Pellenc, Route de Villelaure, Pertuis 84120, France**

**Filed Dec. 14, 1976, Ser. No. 750,526**

**Claims priority, application France, Dec. 24, 1975, 75 40194; Oct. 15, 1976, 76 31808**

**Int. Cl.[2] B26B *15/00***

**U.S. Cl. 30—228** **9 Claims**



1. In hydraulic secateurs, of the kind having

(i) a handle

(ii) a pair of relatively movable blades carried by said handle;

(iii) a cylinder body in said handle, having a bore;

(iv) a piston slidable axially in the bore of said cylinder body;

(v) means connecting said piston to one of said blades;

(vi) a spool valve, for control of hydraulic fluid for operating said piston, said valve being disposed in said cylinder body, said valve including a cylindrical jacket disposed in the cylinder body and having its axis perpendicular to the axis of the cylinder bore and a valve spool slidable axially in said jacket,

the improvement which comprises:

(a) said jacket having in its external surface three axially spaced circumferential grooves, a first of said grooves being in permanent communication with an aperture in the cylinder opening into the cylinder bore, a second of said grooves being in permanent communication with a fluid intake passage in said cylinder body, the third of said grooves being in permanent communication with a fluid outlet passage in said cylinder body;

(b) said valve spool having a first axial end position and a second axial end position of movement in said jacket, said valve spool in its first end position placing said first groove in communication with said second groove, said valve spool in its second end position placing said first groove in communication with said third groove.

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**4,109,382**

## ENOSSAL IMPLANT

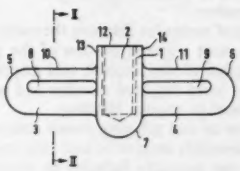
**Werner Lutz Koch, Schwalbenweg 5, 3973 Libenau, Germany**

**Filed Feb. 12, 1976, Ser. No. 657,582**

**Claims priority, application Fed. Rep. of Germany, Feb. 12, 1975, 2505734; Feb. 13, 1975, 2505914**

**Int. Cl.[2] A61C *13/00***

**U.S. Cl. 32—10 A** **11 Claims**



1. An improved implant for anchoring a denture, said improved implant being surgically introduceable into a cavity in a jaw bone and comprising, in combination:

a rigid upright cylindrical post of pre-selected height and outer diameter with its longitudinal axis defining a first

reference axis, said upright cylindrical post having a bottom end within said cavity when said anchoring member is set in said jaw bone;

at least one rigid, generally planar carrying arm laterally attached to said upright cylindrical post having a preselected length in the direction of a second reference axis perpendicular to said first reference axis, a thickness less than said outer diameter of said upright cylindrical post in a direction perpendicular to the plane defined by said first and second reference axes, a top edge and a bottom edge, and a width from said top edge to said bottom edge not greater than the height of said upright cylindrical post in a direction parallel to said first reference axis; and

means for fastening said upright cylindrical post of said anchoring member to said denture;

said bottom end of said upright cylindrical post being rounded and extending below said bottom edge of said carrying arm; and

said bottom edge of said carrying arm being continuous, flat, substantially unbroken, and said bottom edge lying in a plane substantially perpendicular to said first reference axis.

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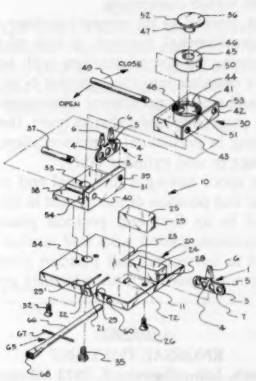
**4,109,383**

## DENTAL IMPLANT BENDER

**Gerald M. Reed, 660 Valley Rd., Glencoe, Ill. 60022, and George E. Carpin, 398 Owen Ct., Prospect Hts., Ill. 60070**

**Filed Jun. 21, 1976, Ser. No. 698,190**
**Int. Cl.[2] A61C *13/00***
**U.S. Cl. 32—10 A** **11 Claims**




1. An apparatus for bending endosteal dental implants having a generally thin planar blade member having a laterally broader dimension than vertical dimension, and having an intermediate neck portion joining said blade member to a head member which is adapted to receive a dental prosthesis, comprising in operative combination:

a. a base member;

b. a plurality of means for gripping the entire vertical dimension of at least a lateral portion of the generally planar blade member of said implant, said gripping means being adapted to leave the head member and neck portion free for rotational or angular bending;

c. at least one of said gripping means comprises a movable-jaw vise assembly secured to said base member, said movable-jaw vise assembly includes an internal cam, a cam-actuated jaw adapted to reciprocate relative to a fixed jaw upon rotational motion of said cam, lever means engaging said cam to impart said rotational motion of said cam, and means for reciprocably guiding said jaw into clamping alignment with said fixed jaw;

d. means for bending said neck relative to said blade so that said head member is oriented in a different angular or a rotational mode, said bending means being adapted to engage said head member while leaving said neck portion free to permit accurate bending thereof;

e. a second of said gripping means comprises means for removably receiving at least a portion of the blade of said implant to permit arcuate bending of said blade which includes a pair of generally parallel faces in opposed, spaced-apart fixed relationship, the distance apart of said faces being predetermined to provide frictionally resistant but slidable retention of said blade member therebetween.

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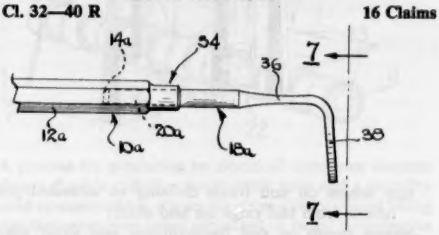
**4,109,384**

## DENTAL TOOLS

**Hubert J. Dorian, 10527 Leconte Ave., Los Angeles, Calif. 90024**

**Continuation of Ser. No. 593,225, Jul. 7, 1975, abandoned. This application Nov. 4, 1977, Ser. No. 848,765**
**Int. Cl.[2] A61C *3/02***
**U.S. Cl. 32—40 R** **16 Claims**




1. A dental tool assembly for performing dental work on the teeth or restorations in the oral cavity of a human being, said tool assembly comprising a handle assembly have an elongated hand-grip portion, said hand-grip portion having a recess formed on one transverse end thereof, a replaceable tool section having a securement end and a working end opposite said securement end, said working end having a contact section sized and shaped to perform dental work on the teeth or restoration in the oval cavity of a human being, said hand-grip portion having said recesses defined by an interior wall and an end wall, said securement end having an extension with an outer surface with a size and shape to fit within and which is closely spaced to the interior wall of said recess, and said extension having an end wall spaced from the end wall of said recess to form a space therebetween, and a heat responsive solder material securement means to retentively, but nevertheless removably, hold the extension on the securement end of said tool section within the recess of said hand-grip portion, said solder material being comprised of a tin-lead alloy composition and essentially surrounding the outer surface of said securement end and bonding the extension on the securement end to the interior wall of said aperature upon heating to a temperature where the composition liquifies and thereafter hardens upon cooling to create a metal bond between the interior wall and said securement end, but which solder material is capable of releasing said securement end on heating of the same to a temperature where the composition liquifies, said composition being applied in such amount that all said composition remains entirely within said recess and any excess thereof being disposed in said space.

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**4,109,385**

## METHOD OF STIPPLING, AND STIPPLING MANDREL THEREFOR

**Eric H. Zahn, Bellevue, and Philip W. Martin, Seattle, both of Wash., assignors to Sterndent Corp., Old Greenwich, Conn.**

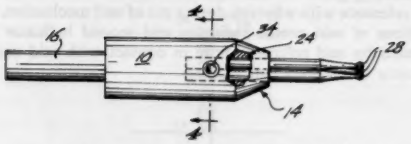
**Filed Aug. 19, 1976, Ser. No. 715,650**
**Int. Cl.[2] A61C *3/06*; B26D *1/12***
**U.S. Cl. 32—59** **3 Claims**

1. A stippling mandrel, comprising:

a tool body adapted to be chucked for rotational drive;

said tool body having a cylindrical cavity extending axially inward at its outer end;

a cluster of similar burr shanks coextensively inserted into and substantially filling said cavity in side-by-side relation, the dimensions of said cluster being such that each shank has line contact with the inner surface of said cavity and with the shanks adjacent thereto; and




a screw threadedly mounted in the wall of said cavity and having an inner end penetrating said cavity and being disposed to bear in an interstice between an adjacent pair of shanks;

each said shank having a burr on its outer end no larger than the diameter of said shank.

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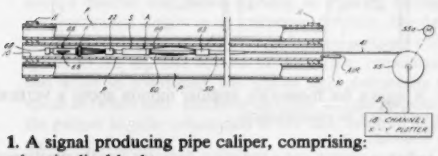
**4,109,386**

## SIGNAL-PRODUCING PIPE CALIPER

**John C. Kinley, 5815 Royalton, Houston, Tex. 77027; Clifford E. Anderson; Charles W. Agee, and Harry E. Dieckman, all of Houston, Tex., assignors to John C. Kinley, Houston, Tex.**

**Filed May 29, 1975, Ser. No. 581,897**
**Int. Cl.[2] G01B** *05/12*
**U.S. Cl. 33—178 F** **9 Claims**



1. A signal producing pipe caliper, comprising:

a longitudinal body;

a plurality of caliper feelers releasably mounted on said body for lateral movement relative thereto;

a signal producing system for producing signals responsive to movement of each of said feelers;

said signal producing system having a movement transmitting means operatively engaged by said caliper feelers and responsive to lateral movements of said feelers;

means for mounting the signal producing system with said body;

means for releasably mounting each of said feelers on said body separately from said signal producing system mounting means for permitting removal of each said feeler and replacement with another feeler without disconnecting said signal producing system from said body;

said body has a plurality of longitudinal slots therein, one for each said feeler; and

said feeler mounting means includes a longitudinally slidable sleeve releasably secured with the body which normally extends over a portion of each said feeler and confines same in predetermined longitudinal and radial locations on said body.

5. A signal producing pipe caliper, comprising:

a longitudinal body;

a plurality of caliper feelers releasably mounted on said body for lateral movement relative thereto;

a signal producing system for producing signals responsive to movement of each of said feelers;

said signal producing system having a movement transmitting means operatively engaged by said caliper feelers and responsive to lateral movements of said feelers;

means for mounting the signal producing system with said body;

means for releasably mounting each of said feelers on said body separately from said signal producing system mounting means for permitting removal of each said feeler and replacement with another feeler without disconnecting said signal producing system from said body;

latch means for releasably locking said feelers in a retracted position radially inwardly with respect to said longitudinal body;

latch release means for releasing said latch means while said caliper is in the pipe to be calipered;

a latch receptacle for receiving a portion of each of said feelers; and

a solenoid actuated rod operably connected to said receptacle and remotely operated to inactivate said latch means.

8. A signal producing pipe caliper, comprising:

a longitudinal body;

a plurality of caliper feelers releasably mounted on said body for lateral movement relative thereto;

a signal producing system for producing signals responsive to movement of each of said feelers;

said signal producing system having a movement transmitting means operatively engaged by said caliper feelers and responsive to lateral movement of said feelers;

means for mounting the signal producing system with said body;

means for releasably mounting each of said feelers on said body separately from said signal producing system mounting means for permitting removal of each said feeler and replacement with another feeler without disconnecting said signal producing system from said body;

latch means for releasably locking said feelers in a retracted position radially inwardly with respect to said longitudinal body;

latch release means for releasing said latch means while said caliper is in the pipe to be calipered; and

centralizer shoes mounted with said body for resilient engagement with the inside of the pipe to be calipered, and with each shoe being offset longitudinally with respect to the other shoes.

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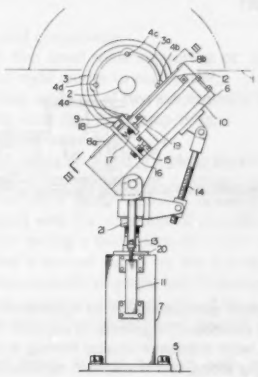
**4,109,387**

## POSITION DETECTING APPARATUS

**Noboru Matsuoka, Eniwa, and Kengo Sugiyama, Abiko, both of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Dec. 29, 1976, Ser. No. 755,129**
**Int. Cl.[2] G01B** *7/31, 7/315*
**U.S. Cl. 33—185 V** **7 Claims**



1. An apparatus for detecting the position of the center of rotation of a rotary surface having secured thereto a plurality of projections disposed on a concentric pitch circle in said

rotary surface and angularly equidistantly spaced apart from each other, comprising:

position correcting means having a surface movable toward and away from said projections for correcting the angular positions of said projections by rotation of said rotary surface;

first drive means drivingly connected to said position correcting means for moving the position correcting means toward said projections and into engagement with a first one of said projections to rotate said rotary surface until a second one of said projections adjacent to said first projection comes into engagement with said surface of said position correcting means and for thereafter moving said position correcting means away from said projections to be out of engagement with said first and second projections;

position detecting means mounted on said position correcting means and movable along said surface of said position correcting means toward and away from said first and second projections which are in engagement with the surface of said position correcting means for detecting the position of one of said first and second projections;

second drive means drivingly connected to said position detecting means for moving said position detecting means along the surface of said position correcting means toward said first and second projections which are in engagement with said surface of said position correcting means until it comes into engagement with one of said first and second projections, and for thereafter moving said position detecting means along said surface of said position correcting means away from said projections to be out of engagement with any projection;

first displacement detecting means for detecting the displacement of said position correcting means during its movement into engagement with said projections and producing a first signal proportional to said displacement;

second displacement detecting means for detecting the displacement of said position detecting means during its movement into engagement with one projection and producing a second signal proportional to said displacement; and

means receiving said first and second signals from said first and second displacement detecting means for calculating the position of the center of rotation of said rotary surface.

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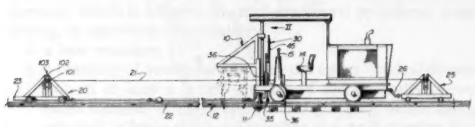
**4,109,388**

## NEEDLE INDICATOR FOR RAIL LINER

**John K. Stewart, Columbia, S.C., assignor to Canron, Inc., New York, N.Y.**

**Filed Nov. 1, 1976, Ser. No. 739,446**
**Int. Cl.[2] E01D *29/04***
**U.S. Cl. 33—287** **11 Claims**



1. An indicator mechanism for an apparatus for correcting the grade and horizontal alignment of railroad track in accordance with a wire reference system having a reference wire tautly extending along said track, said mechanism comprising frame means, the position of said frame means in use being referenced to the existing position of an adjacent section of the railroad track, pivot means mounted on said frame means, a needle indicator mounted on said pivot means to pivot about a horizontal axis generally parallel to the reference wire, a second indicator mounted on said needle indicator for generally vertical, sliding movement thereon, first index means arranged on said frame means to indicate in combination with said needle indicator the existing horizontal alignment of said adjacent section with reference to said reference wire, second index means to indicate in combination with said second indicator the existing grade of said adjacent section with reference to said reference wire wherein, during use of said mechanism, the positions of said needle indicator and second indicator are adjusted by said reference wire in contact with said needle indicator and second indicator.

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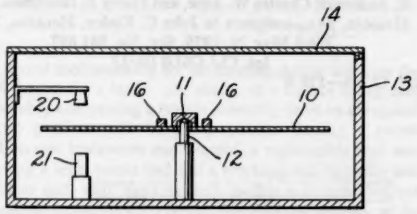
**4,109,389**

## SHAFT ANGLE TRANSDUCER

**Orville R. Balcom, Lomita; Cleve R. Hildebrand, Torrance, and Edward L. Pollard, Santa Ana, all of Calif., assignors to Cetec Corporation, Santa Ana, Calif.**

**Filed Mar. 8, 1976, Ser. No. 664,550**
**Int. Cl.[2] G01C *17/26***
**U.S. Cl. 33—363 K** **11 Claims**




1. A sensor for measuring angular motion about a vertical axis including in combination:

a housing;

a radiaton source and a radiation detector fixedly positioned in said housing in spaced relation, with said source directing radiation along a path to said detector; and

a radiation control member having a magnet coupled thereto, with said housing and member having interengaging pivot means spaced from said path and supporting said member in said housing at a single point for pivoting of said member about a vertical axis relative to said housing and for pitch and roll of said member relative to said housing,

a part of said member being disposed between said source and detector and extending across said path whereby pitch and roll of said member will position different radial regions of the member across said path,

the part of said member between said source and detector having a plurality of radial segments, each segment having discrete opaque and transparent portions separated from corresponding portions of adjacent segments, with the opaque portions having a substantially uniform density and with the transparent portions having a substantially uniform density,

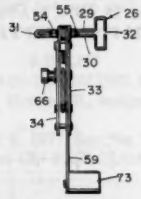
the proportion of said opaque and transparent portions changing from segment to segment as a predetermined function of angular position of the segments about said vertical axis but with said proportion being the same in all said radial regions in each segment so that the transmission characteristic is not adversely affected by pitch or roll,

said source and detector defining a radiation transmission zone along said path of a size to overlie a plurality of adjacent segments.

## 4,109,390
## BOW SIGHT

Kenneth J. Smith, 5402 Newcastle Dr. SE., and Jerry F. Anderson, 5390 Newcastle Dr. SE, both of Kentwood, Mich. 49508

Filed Oct. 14, 1976, Ser. No. 732,508
Int. Cl.[2] F41G *1/46*
U.S. Cl. 33—265 10 Claims




1. In combination with an archery bow, a bow sight, comprising:

a frame adapted for attachment to a bow adjacent the grip thereof; and

a sighting element having reference sections spaced apart a predetermined distance, said element being mounted on said frame by means providing limited rotation about at least one normally horizontal axis between a first position in which said reference sections are disposed in a substantially vertical plane, and a second position in which said reference sections are disposed in a plane angularly displaced from said first plane, wherein the reference sections are moved downwardly as said sighting element moves from said first position to said second position, in such a manner that when sighting to a target having a predetermined height at an unknown distance, the sighting element is moved until the reference sections correspond to the top and bottom of the target, respectively, and when so positioned, the line of sight defined by the space between said reference sections will correspond to the proper angular orientation of the bow to shoot to said unknown distance.

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## 4,109,391
## PORTABLE SURVEYING COMPASS WITH FLUX VALVE AND GYROCOMPASS ALIGNMENT MODES

Willis G. Wing, Glen Head, N.Y., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Jan. 10, 1977, Ser. No. 758,292
Int. Cl.[2] G01C *19/38, 1/02*
U.S. Cl. 33—275 G 15 Claims

1. A gyroscopic compass comprising:

support means including external casing means,

follow-up container means within said external casing means journaled for rotation about a normally vertical axis,

floated gyroscopic assembly means within said follow-up container means buoyantly supported only by liquid contained within said follow-up container means,

gyroscope rotor means journaled about a normally horizontal axis within said floated gyroscopic assembly means,

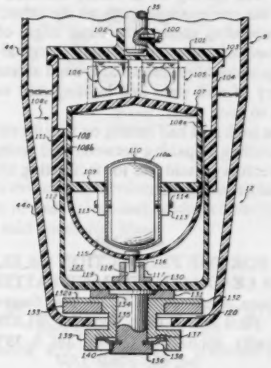
angle pick-off means responsive to the difference between the azimuth position of said floated gyroscopic assembly means and said follow-up container means for developing a first control signal at output terminals thereof,

torquer means responsive to said first control signal for continuously repositioning said floated gyroscopic assembly means to decrease said difference substantially to zero,

flux valve means supported by said follow-up container means for providing a second control signal at output terminals thereof,

motive means selectively responsive to said first or second control signal for driving said followup container means,

sighting means journaled for free rotation with respect to said follow-up means, and



display means responsive to the difference between the azimuth position of said follow-up container means and said sighting means.

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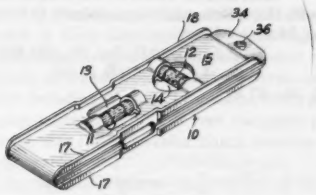
## 4,109,392
## POCKET LEVEL

Walter E. Streeter, Coral Springs, Fla., assignor to Mayes Brothers Tool Manufacturing Co., Johnson City, Tenn.

Continuation of Ser. No. 713,187, Aug. 10, 1976, abandoned.
This application Sep. 22, 1977, Ser. No. 835,484
Int. Cl.[2] G01C *9/28*
U.S. Cl. 33—381 9 Claims




1. A spirit level comprising,

a body and two level vials supported on said body and disposed at right angles to each other,

said body being made up of two substantially identical separate halves, each said half comprising,

a relatively thin planar web,

each said web being disposed in a plane parallel to the other and having a first opening and a second opening spaced axially from each other with the openings of one web being aligned with the openings of the other web,

each said web having a first recess on a first side of a each opening and a second recess on the second side of each opening diametrically opposite said first recess, said recesses adapted to receive the ends of said level vial for positioning the vial at a predetermined position relative to the body,

said recesses being formed by said web material being curved outwardly to form a cavity in the form of a half cylinder adapted to conform to the outside surface of an end of said level vials,

means for holding said webs together with said level vials

therebetween with the ends of said vials disposed in said recesses,

each vial extending across a said opening from one side thereof to the other,

each said web having an inwardly directed rib extending toward the corresponding rib on the other,

said ribs extending around the outer edges of said recesses and around said openings defining marginal edges for said openings and said recesses and around at least a part of the periphery of said webs and holding said webs in spaced relation to each other,

said ribs on each said half resting on the ribs on the other said half providing a spacing between said webs,

energy directors on said ribs for facilitating ultrasonic welding of said ribs together.

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**4,109,393**

## METHOD FOR THE PRODUCTION OF ELECTRODES FOR LEAD-ACID STORAGE BATTERIES

**Pavlos Nikolaou, Alicarnassou St. 22, Nea Smyrni, Greece**

**Filed Jul. 1, 1976, Ser. No. 701,879**
**Claims priority, application Greece, Jul. 4, 1975, 6957**
**Int. Cl.² F26B *3/04***
**U.S. Cl. 34—22** **6 Claims**

1. A method for the production of lead-acid storage battery electrodes having a grid of lead alloy filled with active materials, consisting essentially of lead oxides, leadpowder, sulphuric acid and water, said method comrising exposing said electrodes to a jet of a gas at 500°to 900°C at a velocity of the order of several meters per second for a time of the order of a few seconds, the time and temperature being related whereby the electrodes are processed without being destroyed to dry the surface of the electrodes while leaving the interior moist, and storing the thus superficially dried electrodes to allow the active materials to react chemically to produce the final electrodes, the electrodes being sufficiently dry to allow them to be brought into contact during storage without sticking.

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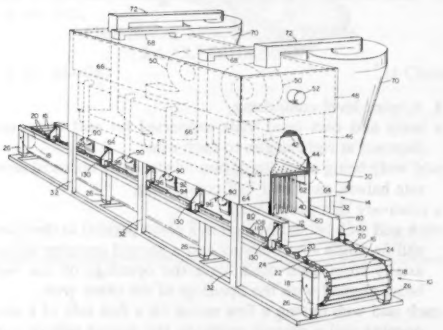
**4,109,394**

## MATERIAL TREATMENT SYSTEM

**Charles W. Hoyt, Belmont, Mass., assignor to Wolverine Corporation, Methuen, Mass.**

**Filed Jan. 5, 1977, Ser. No. 756,896**
**Int. Cl.² F26B *17/04***
**U.S. Cl. 34—57 B** **15 Claims**



1. In a system for treatment of particulate material comprising a conveyor for transporting particulate material through a treatment zone and a gas flow system for placing particles on the conveyor in fluidized condition as they move through the treatment zone,

the improvement of means along the side of the treatment zone for projecting a gaseous stream downwardly against and inwardly along the transport surface of the conveyor to provide boundary sheath gas flow along the edge of the treatment zone, said boundary sheath gas flow containing particles on said conveyor and contributing to the fluidization of particles on the conveyor at the side boundary of the particle treatment zone.

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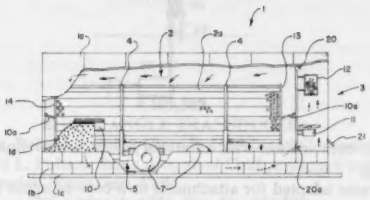
**4,109,395**

## GREENHOUSE, DRYING, STORING NURSERY SYSTEM

**Barney K. Huang, 2008 Varnell Ave., Raleigh, N.C. 27612**

**Filed Oct. 28, 1976, Ser. No. 736,533**
**Int. Cl.² F26B *19/00*; F24J *3/02***
**U.S. Cl. 34—93** **6 Claims**



1. A multi-purpose structure adapted for use as a drier or greenhouse comprising: a main outer structural housing including a transparent outer surface for allowing available solar radiation to be transmitted through said outer structural housing; at least one rotor structure normally disposed interiorly of said main outer structural housing and exposed to available solar radiation transmitted through said outer structural housing, said rotor structure when used in a drying mode of operation including a cylindrifal wall structure that has the capability to support and hold material; support means normally disposed interiorly of said outer structural housing for supporting said rotor structure interiorly of said outer structural housing, said support means including a portable like trailer having wheel means for allowing said trailer to be moved in and out of said structure; rotor drive means operatively associated with said rotor structure for rotatively driving the same, and a furnace system operatively associated with said multi-purpose structure for circulating air through the interior of said structure and including heating means for heating the air as necessary in order to maintain a desired temperature level within said structure.

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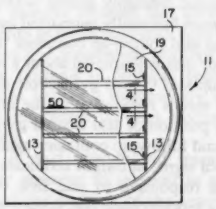
**4,109,396**

## METHOD AND APPARATUS FOR AN IMPROVED SHELF AND TRAY ASSEMBLY FOR A FREEZE DRYER

**Douglas S. Fraser, New Paltz, N.Y., assignor to FTS Systems, Inc., Stone Ridge, N.Y.**

**Filed Dec. 6, 1976, Ser. No. 747,939**
**Int. Cl.² F26B *11/18, 25/18***
**U.S. Cl. 34—192** **10 Claims**



1. In a freeze drying chamber, at least one shelf and tray assembly comprising a shelf having a substantially flat upper surface, said shelf being hollow and allowing for the rapid circulation of a heat transfer fluid within, a tray for containing material to be freeze dried, said tray having tapered hold-down

rails on opposing sides, said chamber having elongated tapered hold-down rails on opposite sides above said shelf, said hold-down rails of said tray tapering in an opposite direction from said hold-down rails of said chamber, said hold-down rails of said shelf mating and locking with said hold-down rails of said tray when said tray is inserted onto said substantially flat upper surface of said shelf, thereby bringing said tray into intimate contact with said upper surface of said shelf and increasing the transfer of thermal energy between said shelf and tray.

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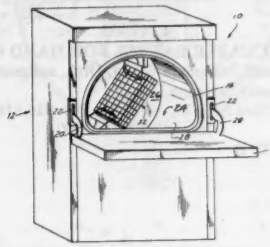
**4,109,397**

## ROTATABLE, NON-TUMBLING DRYING RACK

**Thomas Edward Daily, Herrin, Ill., assignor to Fedders Corporation, Edison, N.J.**

**Filed Feb. 9, 1977, Ser. No. 766,939**
**Int. Cl.[2] F26B *23/04***
**U.S. Cl. 34—239** **8 Claims**



1. A drying rack for a dryer of the type having a rotating drum for preventing tumbling of the articles received in said rack:

an open-work basket portion for receiving articles, said basket comprising a bottom wall, opposed side walls, a front wall and a rear wall;

a cover for said basket portion;

cooperating closing means on said basket portion and said cover for affixing said cover to said basket portion at a preselected one of a plurality of different heights from said bottom wall;

and mounting means for releasably mounting said rack on the drum to prevent tumbling of said rack as the drum rotates, said basket portion comprising a plurality of spaced upstanding rods in each of said side, front and rear walls; and a plurality of vertically spaced substantially horizontal rods extending about said side, front and rear walls; said closing means comprising bifurcated extensions on one edge of said cover adapted to receive one of said horizontal rods therein, and an extendable bifurcated member at the opposite edge of said cover adapted to engage said one of said horizontal rods to connect said cover to said basket portion at the desired height above said bottom wall.

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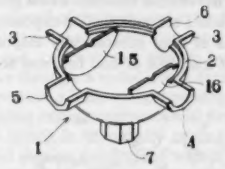
**4,109,398**

## CONSTRUCTION TYPE EDUCATIONAL AND AMUSEMENT DEVICE

**Hiroyuki Hida, Tokyo, Japan, assignor to Mitsubishi Pencil Co. Ltd., Tokyo, Japan**

**Filed Aug. 16, 1976, Ser. No. 714,354**
**Claims priority, application Japan, Aug. 16, 1975, 50-99583**
**Int. Cl.[2] G09B *25/02;* A63H *33/30, 17/12***
**U.S. Cl. 35—13** **28 Claims**

1. In an educational and amusement construction type assembly, first and second hollow substantially identical halves forming a generally symmetrical hollow capsule having a polar diameter and an equatorial plane intersecting the mid-point of said polar diameter, normal thereto, said halves having contacting peripheral edges lying in said equatorial plane, and first and second tubular projections extending radially outwardly from said capsule at the respective ends of a first diameter in said equatorial plane, each said projection being formed by




matching semi-cylindrical tubular portions each integral with a respective one of said halves and having contacting edge surfaces lying in said equatorial plane.

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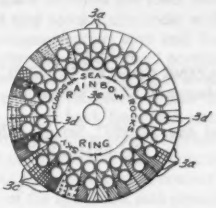
**4,109,399**

## PAINT - BY - RAINBOW - RING ART KIT WITH PRESTROKED PANEL

**Marko Ivancevich, 423 N. Broadway, Redondo Beach, Calif. 90277**

**Filed May 22, 1975, Ser. No. 579,957**
**Int. Cl.[2] G09B *11/10***
**U.S. Cl. 35—26** **4 Claims**




1. The method of producing a painted picture from an art kit comprising the steps of:

employing a thin plastic panel within an art kit upon which is impressed in three dimensions the basic outline of a picture with there being several separate distinct sections of the picture, such as sky, sea, clouds and terrain and each said section including impressed simulated brush strokes;

also employing within the art kit at least one guide print to denote to the user the exact color object location on the thin plastic panel;

comparing the three dimensional basic outline of the panel with the color outline of the sections on the guide print thereby clearly ascertaining the type of section and its color arrangement;

having available within the art kit a plurality of shades of selected colors for each said section and each said shade is preselected to be satisfactory for the picture for representation of the said sections;

selecting a particular said shade for each said section from the respective group of color shades; and

applying a thin coating of the select color shade to its respective said section thereby coloring the said section with the impressed simulated brush strokes showing through the coating of paint.

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**4,109,400**

## SCRAPER UNLOADING SYSTEM

**Warner G. Richardson, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

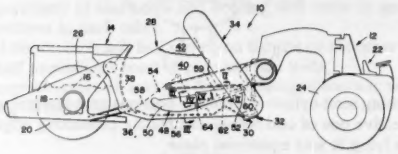
**Filed Apr. 11, 1977, Ser. No. 786,180**
**Int. Cl.[2] E02F *9/28;* B60P *1/36***
**U.S. Cl. 37—126 AC** **9 Claims**

1. A bowl assembly for a construction vehicle comprising

a pair of laterally spaced first and second sidewalls defining an opening therebelow,

a movable bowl portion movably mounted on said bowl assembly for movement between a first position covering said opening and a second position exposing said opening,

actuating means at least substantially disposed within the confines of at least one of said first and second sidewalls



for selectively moving said bowl portion between its first and second positions, said actuating means connected to said bowl portion through an elongated slot formed through said one sidewall, and

masking means for continuously covering said slot upon actuation of said actuating means for moving said bowl portion between its first and second positions.

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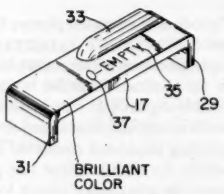
**4,109,401**

**MAGAZINE CONTENTS INDICATORS**

**Daniel Dennis Musgrave, 8201 Caraway St., Cabin John, Md. 20731**

**Filed Aug. 22, 1977, Ser. No. 826,895**
**Int. Cl.[2] F41C *25/02***
**U.S. Cl. 42—50** **3 Claims**




1. A cartridge magazine follower having visible means thereon positionally adapted to facilitate visual determination of whether said follower is so positioned in a magazine that said magazine must necessarily be empty of cartridges, said visible means including a luminescent coloration.

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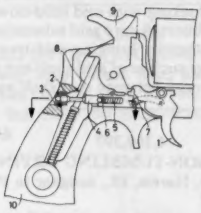
**4,109,402**

**DEVICE FOR REGULATING THE PRESSURE TO BE APPLIED TO THE TRIGGER ON FIREARMS**

**Inigo Diaz Guardamino, Avda. La Vega, 48 Guernica, Spain**

**Filed Dec. 17, 1975, Ser. No. 641,446**
**Claims priority, application Spain, Dec. 28, 1974, 208.736**
**Int. Cl.[2] F41C *19/00***
**U.S. Cl. 42—65** **1 Claim**

1. A device for regulating the pressure applied to a firing trigger of a fire-arm having a butt comprising a slide linked to said firing trigger, a spring having first and second ends, the first end of said spring bearing against said slide, a link member having first and second ends bearing at its first end against the second end of said spring, threaded means in said butt for moving said link member whereby said spring is compressed, said threaded means having means for permitting rotation thereof from outside said fire-arm, means on said slide for



permitting it to move axially without turning, a hole in said link member, and a hammer pushrod passing through said hole.

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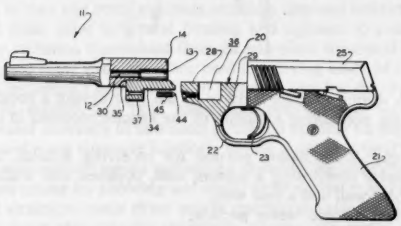
**4,109,403**

**DETACHABLE BARREL FOR HAND GUNS**

**Joseph A. Badali, Mountain Green, Utah, assignor to Browning Arms Company, Morgan, Utah**

**Filed Sep. 25, 1975, Ser. No. 616,618**
**Int. Cl.[2] F41C *21/00***
**U.S. Cl. 42—75 B** **3 Claims**



1. In a firearm of the type having a frame, a detachable barrel mounted in longitudinal alignment on the frame and means for positively connecting the barrel to the frame, the improvement which comprises:

a well in said frame beneath the chamber end of said barrel;

a barrel block extending down into said well from attachment to said barrel, said barrel block being in loose fit relation with said well and having a bore in approximately parallel relation with said barrel and countersunk at the forward surface of the barrel block;

a threaded bore through the forward surface of the frame in open communication with said well and in approximately parallel alignment with the bore in said barrel block but with its axis lower with respect to said barrel than the axis of the bore in said barrel block; and

a barrel screw threaded through said threaded bore with a tapered lead end in engagement with said countersunk portion of the bore in said barrel block, thereby to urge said barrel down and back with respect to said frame.

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**4,109,404**

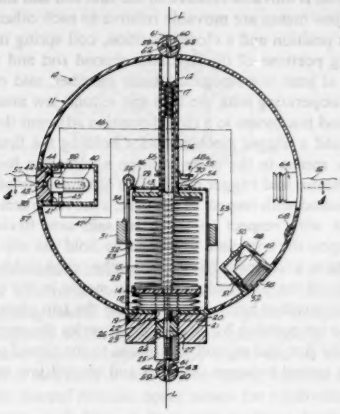
**BITE SIGNALLING FISHING BOBBER WITH FLEXIBLE HOUSING**

**Raymond C. Preeschl, 425 E. 25th St., Hialeah, Fla. 33013**

**Filed Jul. 19, 1976, Ser. No. 706,498**
**Int. Cl.[2] A01K *85/01, 93/00, 97/12***
**U.S. Cl. 43—17** **9 Claims**

1. A bite signalling fishing bobber comprising, in combination, a hollow, air pressure inflated, substantially spherical flexible housing, an electrical signalling device within said housing, an energizing circuit for said signalling device, normally open-circuit switch means in said energizing circuit and

within said housing, means for attaching a fishing line to said housing, said fishing line attaching means comprising a substantially diametrically-extending through opening in said housing through which the fishing line can be threaded, and abutment stop means adjustably positioned along the fishing line in substantially abutting relation with diametrically opposed end portions of said housing, said line attaching means being operative to compressingly distort said flexible housing along the axis of said diametrically-extending through housing



opening and thereby vary the cross-sectional shape of said housing along said diametrically-extending axis as a function of tensional stress being imposed along the fishing line from below said housing member while said housing is being floatingly supported from underneath by a body of water, a distortion counteracting spring within said housing and constrained along said diametrically-extending axis thereof, and means responsive to said distortion for close-circuiting said switch means so as to energize said electrical signaling device.

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**4,109,405**

## CAPSULE LAMP AS A FISHING TACKLE

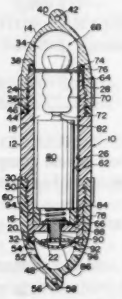
**Kiyomatsu Ito, No. 15-15, 1-chome, Chuo, Edogawa-ku, Tokyo, Japan**

**Filed May 3, 1977, Ser. No. 793,374**

**Claims priority, application Japan, May 19, 1976, 51-6383[U]; Oct. 21, 1976, 51-140643[U]**

**Int. Cl.[2] A01K** *93/00, 75/02;* **F21V** *33/00*

**U.S. Cl. 43—17.5** **12 Claims**



1. A capsule lamp as a fishing tackle, comprising a casing structure consisting of a unitary tubular body having longitudinal first and second end portions and an annular end wall portion axially inwardly recessed from the extreme end of the second end portion and formed with an aperture, said body having an internal groove formed in the inner peripheral wall of the body and extending longitudinally between the extreme end of said first end portion and the inner end face of said annular end wall portion and an external groove formed in the outer peripheral wall of the body and extending substantially in parallel with said internal groove a predetermined length from said extreme end, said external groove being joined to said internal groove through a radial notch formed in the edge of said first end portion, a hollow, light-passing closure element in threadedly mating engagement with said first end portion, and a hollow end fitting in threadedly mating engagement with said second end portion and formed with at least one opening, the end fitting forming a first internal space between the end fitting and the outer end face of said end wall portion; an electric light bulb positioned within said casing structure and having a first terminal element axially projecting within said body away from said closure element and a flange-shaped second terminal element having an outer circumferential portion detachably secured to said edge of said first end portion of said body by means of said closure element and thereby holding the bulb in position partially within said body and partially within said closure element; a dry cell battery positioned within said tubular body and having a first electrode in direct contact with the first terminal element of the light bulb and a second electrode located axially at a predetermined spacing from the inner end face of said end wall portion and forming a second internal space between the inner end face of the end wall portion and said second electrode, said second internal space being in communication with said first internal space through said aperture in said end wall portion; a unitary, electrically conductive element consisting of an elongated intermediate portion detachably received in said internal groove, a first end portion turned back from said intermediate portion through said notch and detachably received in said external groove, said first end portion of the conductive element being partly received in said notch and in contact with the second terminal element of the light bulb, said closure element having a wall portion detachably fast on said first end portion of the conductive element, and a second end portion substantially perpendicularly bent from said intermediate portion and located within said second internal space, the second end portion of the conductive element extending radially inwardly from said internal groove and terminating short of alignment with the aperture in said end wall portion; an electric contact element having an axially inner portion located within said second internal space and an axially outer portion axially projecting out of said tubular body into said first internal space through said aperture, said contact element being movable in its entirety between a first position having said inner portion seated on the inner end face of said end wall portion and a second position axially spaced apart from the inner end face of the end wall portion, the contact element being in contact with said second end portion of the conductive element when the contact element is in one of the first and second positions thereof and being electrically disconnected from the second end portion of the conductive element when the contact element is in the other of said first and second positions; electrically conductive biasing means positioned within said second internal space and seated between said second electrode and said inner portion for urging said contact element toward said position in which said inner portion is seated on the inner face of said end wall portion; and an elastic, electrically non-conductive diaphragm positioned within said first internal space and having an outer peripheral end detachably secured between said tubular body and said end fitting for dividing said first internal space into an inner variable-volume chamber enclosing said outer end portion of said contact element and an outer variable-volume chamber hermetically isolated from said inner variable-volume chamber and open to the outside of said casing structure through said opening, the diaphragm having an elasticity urging the diaphragm axially away from said outer end face of said end wall portion and being deformable into pressing contact with said outer portion of said contact element for axially moving the contact element toward said posi-

tion in which said inner portion is axially spaced apart from the inner end face of said end wall portion as a fluid pressure higher than atmospheric pressure is developed in said outer variable-volume chamber through said opening.

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**4,109,406**

## PYROTECHNICAL MOLE TRAP

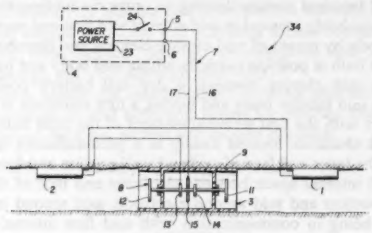
**Claude Denninger, Chazay D'Azergues, France, assignor to Sogemaric, Société de Gestion et de Marketing pour Industries de Consommation, Paris and Societe E. Lacroix, Muret, both of, France**

**Filed Mar. 10, 1977, Ser. No. 776,272**

**Claims priority, application France, Mar. 30, 1976, 76 09764; Jan. 10, 1977, 77 00951**

**Int. Cl.[2] A01M *27/00***

**U.S. Cl. 43—84** **11 Claims**




1. A pyrotechnical mole trap of which at least part is intended to be positioned in a mole run, comprising:

an elongate protective envelope which is open at its ends and which is intended to be placed inside the mole run,

an electrical contactor placed inside the protective envelope,

two displaceable triggers mechanically controlling the electrical contactor, each of these triggers being placed at one of the ends of the protective envelope,

two electrically fired deflagrating pyrotechnical charges of which each is placed on the outside of the protective envelope near each of the triggers,

a source of electrical energy,

an electrical circuit which connects together the electrical contactor, the pyrotechnical charges and the source of electrical energy and which is wired in such a way that the action of the mole on either of the triggers closes the electrical circuit and fires the pyrotechnical charge situated in the immediate proximity of that trigger.

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**4,109,407**

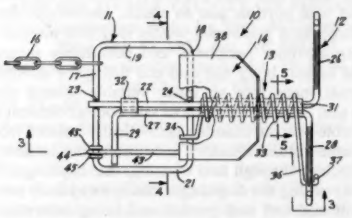
## ANIMAL TRAP

**Oscar F. Johnson, Rte. 1, McIntosh, Minn. 56556**

**Continuation-in-part of Ser. No. 621,853, Oct. 14, 1975, abandoned. This application Dec. 6, 1976, Ser. No. 747,998**

**Int. Cl.[2] A01M *23/24, 23/26***

**U.S. Cl. 43—85** **31 Claims**



1. An animal trap comprising: a base, animal holding means mounted on the base, said animal holding means having a first rod secured to the base, first animal holding jaw means attached to the first rod, a second rod located adjacent the first rod and extended generally parallel thereto, second animal holding jaw means attached to the second rod and located in general transverse alignment with the first jaw means, means including at least one elongate tubular member secured to the first rod and pivotally mounted on the second rod whereby the second rod is movable relative to the first rod and the first and second jaw means are movable relative to each other between an open position and a closed position, coil spring means surrounding portions of the first rod, second rod and means including at least one elongate tubular member, said coil spring means cooperating with the base and second jaw means to bias the second jaw means to a closed position adjacent the first jaw means, and a trigger mechanism for holding the first and second jaw means in the open position against the force of the spring means, said trigger mechanism having a trip plate pivotally mounted with respect to the base, a movable arm pivotally mounted with respect to the base, said arm having means acting upon the trip plate to releasably hold the trip plate in a set position, and means having a member engageable with the arm to hold the first and second jaw means in the open position, said member being released when the trip plate is moved from the set position by an animal whereby the spring means moves the first and second jaw means to the closed position to trap the animal between said first and second jaw means.

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**4,109,408**

## INSECT ELECTROCUTION DEVICE

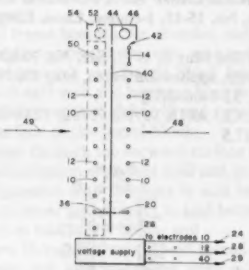
**Mordechai Yavnieli, Tel-Aviv, Israel, assignor to AMCOR Ltd., Tel-Aviv, Israel**

**Filed Jan. 7, 1977, Ser. No. 757,571**

**Claims priority, application Israel, Jan. 14, 1976, 48833**

**Int. Cl.[2] A01M *1/22***

**U.S. Cl. 43—112** **25 Claims**




1. Insect electrocution device comprising:

a surface array composed of an arrangement of spaced first electrodes; and

a sheet electrode disposed along a surface spaced from said surface array;

said first electrodes being maintained at a first potential;

said sheet electrode being maintained at a second potential differing from said first potential;

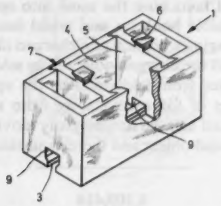
the electrodes forming said surface array being arranged so as to define a first substantially uniform separation therebetween; and

said sheet electrode being spaced from said surface array by a second separation smaller than said first uniform separation.

## 4,109,409
## STRUCTURAL ELEMENT FOR CONSTRUCTION KITS AND METHOD OF MAKING THE ELEMENT

Artur Fischer, Weinhalde 34, D-7244 Waldachtal 3 (Tumlingen), Fed. Rep. of Germany

Filed Jun. 1, 1977, Ser. No. 802,565
Claims priority, application Fed. Rep. of Germany, Jun. 16, 1976, 2626983
Int. Cl.[2] A63H *33/08*
U.S. Cl. 46—25 12 Claims



1. A hollow structural element, particularly for assembly with other structural elements in multielement construction kits, comprising means including an elongated complete circumferential wall bounding an interior space having opposite ends and two pairs of opposite side walls, and an end wall closing one of said ends of said interior space, whereas another of said ends thereof remains open; means for subdividing said interior space, including at least one partition having side portions connectable with said circumferential wall, and an end portion at said open end of said interior space, an undercut coupling projection projecting from said end portion of said one partition at said open end of said interior space in direction away from said end wall outwardly beyond said interior space and engageable in an undercut coupling indentation of another structural element so that in an engaged condition said other structural element bridges said open end of said first-mentioned structural element; and an elongated groove at said end wall and thereby at said closed end of said interior space, said groove extending along the the entire length of said end wall from one to another of one pair of said opposite side walls and having ends which are open thereat, said groove having an undercut portion complementary to said projection for slidably receiving an undercut coupling projection of a further structural element through either of said open ends of said groove.

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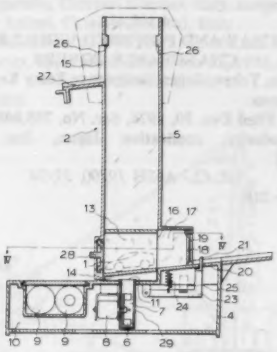
## 4,109,410
## TOY MOTOR CAR CIRCUIT

Shigeru Saito, No. 6-4, 2-chome, Kuramae, Taito-ku, Tokyo, Japan

Filed Sep. 8, 1976, Ser. No. 721,413
Claims priority, application Japan, Sep. 19, 1975, 50-128806[U]
Int. Cl.[2] A63H *29/16*
U.S. Cl. 46—44 10 Claims

1. A toy comprising: an upright hollow tower having an upper end formed with an exit opening and a lower end formed with an entrance opening; an elevator vertically displaceable in said tower piston-fashion and having a bottom wall; a ramp having an upper end at said exit opening and a lower end at said entrance opening; a toy motor car displaceable down along said ramp under its own weight and fittable on said bottom wall of said elevator; door means for preventing emission of air from said tower through said entrance opening but for permitting said car to enter said tower through said entrance opening; and means for supplying air under pressure to the interior of said tower beneath said entrance opening and for forming a gas column in said tower capable of vertically displacing said elevator with said car on said bottom wall from



a position aligned with said entrance opening to a position aligned with said exit opening.

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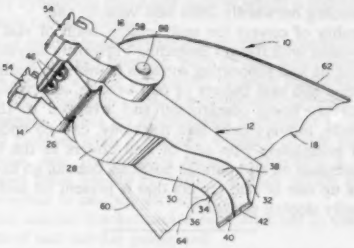
## 4,109,411
## TOY FIGURE GLIDER

Joseph J. Wetherell, Bedford, N.Y.; A. Edward Fogarty, and Bonnie Rose Fogarty, both of Sarasota, Fla., assignors to Ned Strongin Associates, Inc., New York, N.Y.

Filed Feb. 14, 1977, Ser. No. 768,076
Int. Cl.[2] A63H *27/00*
U.S. Cl. 46—79 13 Claims



1. A toy figure glider comprising a body portion made of a soft and resilient open-cell foam material having a front surface and a flat rear surface,

a pair of arms made of a soft and resilient open-cell foam material and adapted to be movably mounted on the sides of said body portion,

a wing portion comprising a relatively thin sheet of flexible, light-weight, closed-cell foam material which is bendable and has shape-retaining properties, and having a width appreciably greater than the width of said body portion,

said wing portion having connecting means for attaching said wing portion to said body portion with the lower surface of said wing portion closely overlying the flat near surface of said body portion and extending substantially parallel thereto,

and a mounting rod extending transversely through said body portion and through said connecting means for mounting said wing portion on said body portion,

said mounting rod also extending through said arms for pivotally mounting said arms at opposite sides of said body portion,

said pivotally-mounted arms being selectively movable to forwardly-extending and rearwardly-extending positions in which they are parallel to the axis of said body portion for launching of the glider through the air with the body

portion substantially horizontal and facing downwardly and the wing portion facing upwardly.

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**4,109,412**

## TRACKWAY AND POWERED VEHICLE WITH CHANGEABLE COVERS

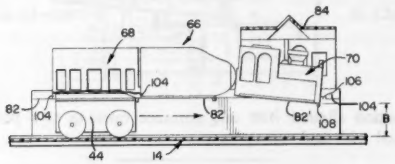
**Makoto Saito, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan**

**Filed Dec. 30, 1976, Ser. No. 755,868**

**Claims priority, application Japan, Jun. 18, 1976, 51/80873[U]**

**Int. Cl.[2] A63H *19/00, 19/34***

**U.S. Cl. 46—216** **4 Claims**




1. A toy train and trackway, comprising:

a trackway provided with a section having a base and upstanding side walls opposite one another on respective sides of said trackway, supporting surfaces provided on said walls which include portions that are parallel to said base and portions that slope downwardly from said parallel portions toward said base,

a powered vehicle provided with wheels that move along said trackway and said base of said section, and flanges extending outwardly from said vehicle; and

a plurality of covers for said vehicle, each of said covers provided with flanges extending outwardly therefrom for engaging said supporting surfaces of said side walls of said section and said flanges of said vehicle, said vehicle and trackway being constructed and arranged so that said vehicle, moving over said trackway, can go underneath and completely pass one of said covers as the latter is maintained on said parallel portions, but can go under and pick up one of said covers that is present on said downwardly sloping portions.

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**4,109,413**

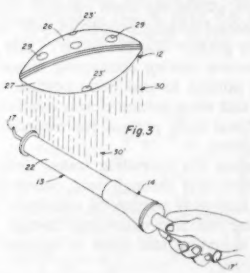
## LEVITATION TOY AND METHOD OF OPERATION THEREOF

**Paul L. Brown, 982 Lakeview Way, Redwood City, Calif. 94062**

**Filed Feb. 9, 1977, Ser. No. 767,205**

**Int. Cl.[2] A63H *33/26***

**U.S. Cl. 46—233** **9 Claims**




1. Equipment for levitating dimensionally convertible shaped levitatable objects; said equipment comprising in combination, a shaped levitatable object of a predetermined dimension and having an opening therethrough, a flat pad for removably holding said object during an electrostatically charging period, and an electrostatically chargeable wand, a flanged handle on one end of said wand, the flange of which has a tapered periphery, an exciter removably seatable upon said tapered periphery of the flange of said handle and slidably as well as rotatably mounted on said wand for inducing an electrostatic charge on said wand while simultaneously inducing an electrostatic charge of the same polarity on said object held on said pad by rolling engagement therewith, and means for lifting said object from said pad after it has received an electrostatic charge and launching the same into space; said means comprising a flexible hook on said wand insertable into said opening and engaging a portion of a charged object adjacent to said opening to lift the charged object from said pad into the air where it is repelled from said wand by the upwardly moving electrostatic lines of force emanating from said electrostatically charged wand and the downwardly moving lines of force emanating from said object and thereby sustained in levitation.

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**4,109,414**

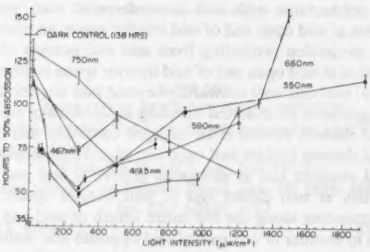
## CONTROL OF PLANTS ABSCISSION PROCESSES BY USING SPECIFIC LIGHT SOURCES

**Prakash G. Kadkade, Marlborough, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.**

**Continuation-in-part of Ser. No. 701,331, Jun. 30, 1976, abandoned. This application Sep. 12, 1977, Ser. No. 832,407**

**Int. Cl.[2] A01G *1/00***

**U.S. Cl. 47—58** **13 Claims**




1. A method for regulating the physiological abscission process of parts of plants comprising the step of illuminating the plant during the night period with narrow band light having a predominant wavelength selected from the group consisting of approximately 420nm, 550nm, 660nm and 740nm.

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**4,109,415**

## PLANT CARE APPARATUS

**Bruce John Hall, 34352 El Molino, Capistrano Beach, Calif. 92624**

**Filed Aug. 19, 1976, Ser. No. 715,890**

**Int. Cl.[2] A47G *7/02***

**U.S. Cl. 47—67** **3 Claims**

1. A receptacle for use with flower pots or the like comprising:

an outer wall having a generally cylindrical configuration;

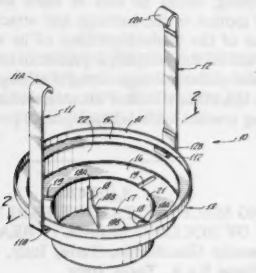
a bottom member jointed to said outer wall;

a plurality of shoulders of different diameters formed as part of said outer wall, each of said plurality of shoulders defining a support member of different diameter, with the smallest diameter support nearest said bottom member;

a plurality of ribs extending from said bottom member and said outer wall, said ribs being upright walls which extend from said outer wall towards the center of said receptacle, each of said ribs having at least two surfaces for supporting a flower pot;

a pair of removable strap means for engaging the outer wall of said receptacle whereby said receptacle can be sus-

pended from a flower pot or the like, each of said strap means including a relatively thin portion with relatively thickened end portions to impart additional strength thereto, said end portions defining hook attaching means for engaging said apertures;



a pair of apertures in the upper portion of said outer wall to receive end portions of said pair of strap means, said apertures diametrically spaced across said receptacle from each other.

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**4,109,416**

## VEHICLE DOOR ARRANGEMENTS

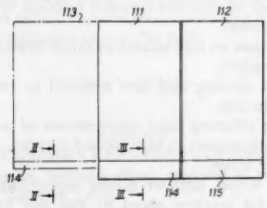
**John Chase Newson; Geoffrey Robinson Tregoning, and James Baden Digby, all of London, England, assignors to Westinghouse Brake & Signal Co. Ltd., London, England**

**Continuation of Ser. No. 553,005, Feb. 25, 1975, abandoned. This application Nov. 29, 1976, Ser. No. 745,864**

**Claims priority, application United Kingdom, Sep. 27, 1974, 41994/74; Dec. 12, 1974, 53843/74; Mar. 21, 1974, 12758/74**

**Int. Cl.[2] E06B *7/28***

**U.S. Cl. 49—316** **3 Claims**



1. A vehicle door arrangement comprising an upper main part and a lower edge part for closing a gap between the upper main part of the door and a doorway occupied by the door when in a closed position, and moving means operable to retract said lower edge part upwardly into the door prior to opening of the door from the closed position thereof and for extending the lower edge part downwardly to close the gap upon reaching said closed position, the lower edge part being hollow and deformable, inflatable and deflatable parts of the lower edge part being formed of inflatable and deflatable bladders enclosed within an outer enclosure of the lower edge part, the lower edge part being mounted by attachment to the ends of a rigid partition dividing the bladders, the ends being made accessible at ends of the outer enclosure, and said moving means comprising pneumatic means for inflating and deflating at least selected parts of the lower edge part.

**4,109,417**

## GUIDE DEVICE FOR A SLIDABLE WINDOW OF A VEHICLE

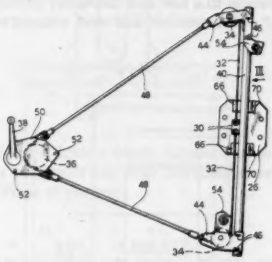
**Pier Paolo Fogarollo, Chiavari (Genoa), Italy, assignor to Lames Societa per Azioni, Chiavari (Genoa), Italy**

**Filed Jun. 9, 1977, Ser. No. 805,043**

**Claims priority, application Italy, Jun. 21, 1976, 68512 A/76**

**Int. Cl.[2] E05F *11/48***

**U.S. Cl. 49—352** **4 Claims**



1. A guide device for a slidable window of a vehicle, comprising:

a support member for attachment to a lower edge of the window;

a central guide track extending in the direction of movement of the window, said guide track being tubular and having therein a longitudinal slot, said guide track having means for its attachment to a vehicle door;

a pair of spaced-apart slidable elements having a substantially cylindrical shape and each of which is slidably fitted in said tubular guide;

a pair of spaced-apart attachment elements connected to the window support member, each of said attachment members having a wing protruding through said longitudinal slot and attached to one of said slidable elements;

transmission means for transmitting movement to the support member from a window winding device such as a handle, said transmission means comprising a flexible looped cable having two adjacent ends which are both connected to said support member;

first and second bracket means each attached to one of the ends of said tubular guide; and

a first pulley rotatably mounted on said first bracket means and a second pulley rotatably mounted on said second bracket means, said looped cable being trained tover said pulleys and the latter defining between them a cable path which extends alongside said tubular guide and which includes said cable ends.

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**4,109,418**

## AUTOMATIC HONING MACHINE AND METHOD

**Günter Ebelt, Westerholt, Fed. Rep. of Germany, assignor to Maschinenfabrik Gluckauf Beukenberg G.m.b.H., Gelsenkirchen, Fed. Rep. of Germany**

**Filed Feb. 7, 1977, Ser. No. 765,946**

**Claims priority, application Fed. Rep. of Germany, Feb. 7, 1976, 2604857**

**Int. Cl.[2] B24B *33/02, 1/00***

**U.S. Cl. 51—34 F** **15 Claims**

1. An apparatus for honing a circular-section recess in a workpiece with at least one abrasive honing tool, said apparatus comprising:

a support;

a vertical guide on said support;

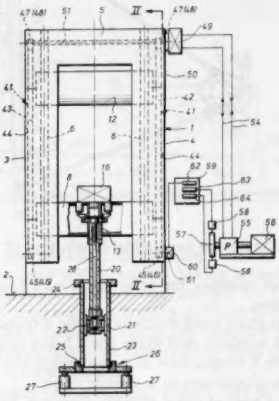
a cross-member vertically displaceable on said guide;

a counterweight vertically displaceable on said guide;

a flexible member interconnecting said counterweight and said cross-member;

drive means including
- a first hydrostatic motor on said support connected to said flexible member, and
- a variable-displacement and reversible hydraulic pump connected to said first motor for oppositely vertically displacing said cross-member and said counterweight on said guide;

sensor means on said support and connected to said pump for detecting the vertical position of said cross-member and for uniformly decelerating said cross-member and said counterweight to a halt and thereafter uniformly accelerating said cross-member and said counterweight in the opposite direction to reverse the vertical displacement of said cross-member each time each of a pair of vertically spaced end positions is reached;



a tool spindle rotatable about an upright axis on said cross-member;

a second hydrostatic motor on said cross-member connected to said spindle for rotating same about said axis;

a holder on said spindle for said tool, whereby when said tool is in said recess said first hydrostatic motor can stroke it vertically therein while said second hydrostatic motor rotates it about said axis; and

means on said cross member for pressing said tool radially of said axis against said workpiece at said recess.

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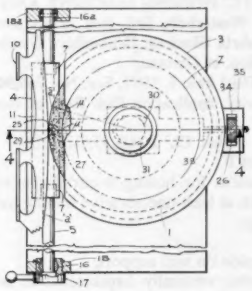
**4,109,419**

## ICE SKATE SHARPENING DEVICES

**Sidney Broadbent, 5265 W. Quarles Dr., Littleton, Colo. 80123**

**Filed Jan. 12, 1977, Ser. No. 758,567**
**Int. Cl.[2] B24B *9/04***
**U.S. Cl. 51—94 R** **20 Claims**



1. A skate sharpening device comprising: a driven cutting wheel having a peripheral surface which is an arc of revolution about the cutting wheel's axis; a linear carriageway parallel to the plane of rotation of the cutting wheel; a carriage in longitudinally guided engagement with the carriageway, having skate attachment means clamping the skate in fixed location relative to the carriage with the centerplane of the blade parallel to the carriageway; unrestricted pivotal means for the carriage during sharpening, about an axis in fixed location, permitting transverse motion of the carriage and attached skate, and the centerplane of the blade regardless of its angular motion, to reside normal to the peripheral profile of the cutting wheel at any location of the carriage along the length of the carriageway, with the blade's hollow arcuate skating surface in accurate cutting contact with said peripheral profile of the cutting wheel.

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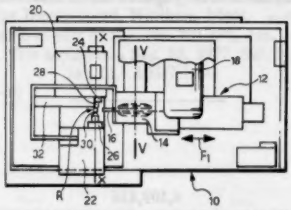
**4,109,420**

## GRINDING MACHINE, PARTICULARLY FOR ROLLERS OF ROLLING ELEMENT BEARINGS

**Renzo Rossetto Giaccherino, Turin, Italy, assignor to Famir International S.p.A., Turin, Italy**

**Filed Jun. 17, 1977, Ser. No. 807,615**
**Int. Cl.[2] B24B *5/04, 41/04***
**U.S. Cl. 51—105 R** **9 Claims**



1. In a grinding machine for grinding rollers of rolling element bearings and like generally cylindrical workpieces having first and second opposed end faces, and comprising:
- a machine bed,
- first and second supports carried on said machine bed,
- first and second mandrels respectively supported on said first and second supports, and axially rotatable about a common axis, said first mandrel being axially fixed with respect to said first support and said second mandrel being axially displaceable with respect to said second support,
- a first nose on said first mandrel directed towards said second mandrel,
- a second nose on said second mandrel directed towards said first mandrel,
- means for driving said first mandrel to rotate about said common axis,
- means for effecting axial displacement of said second mandrel with respect to said second support,
- a grinding wheel,
- grinding wheel support means supporting said grinding wheel for rotation about its axis and for displacement towards and away from a workpiece held between said noses on said first and second mandrels,
- the improvement comprising a support seat on said first nose of said mandrel, said support seat having a shape which is a surface of revolution about said common axis of rotation of said two mandrels, for receiving an end face of the workpiece which is shaped with the complementary surface of revolution,
- an abutment member having a convex surface of contact supported on said second nose of said second mandrel in such a way that it can freely move in all directions in a plane perpendicular to said common axis of rotation of said two mandrels, for engagement with the opposite end face of a workpiece from that engaged by said seat on said first nose of said first mandrel, and
- means for driving said second mandrel to rotate at the same speed and in the same direction at said first mandrel; said

abutment member on said second nose comprises a ball, means defining a planar abutment surface, against which said ball is engageable, on the side of said ball remote from said first noise.

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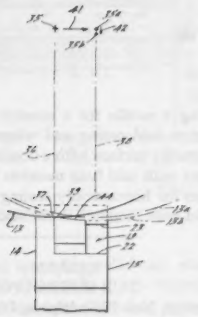
**4,109,421**

## METHOD FOR GRINDING THREAD CUTTING TOOLS

**Joseph F. St. Denis, 26545 Oakland, Roseville, Mich. 48066**

**Filed Mar. 11, 1977, Ser. No. 776,502**
**Int. Cl.[2] B24B *1/00, 3/00***
**U.S. Cl. 51—288** **2 Claims**



1. In a method for forming both the cutting angle and the relief area on a thread cutting or other form cutting tool having a compound relief angle, the steps of providing a jig supporting surface in a horizontal plane and a jig having a tool supporting surface in a plane having an angular relation to said jig supporting surface plane, the intersection of the planes containing said jig and tool supporting surfaces being perpendicular to a vertical plane containing the cutting edge of said tool, placing said tool in said jig so as to be supported by said tool supporting surface, positioning a grinding wheel axis in said vertical plane, retracting the grinding wheel axis perpendicularly from said plane a distance proportional to the desired relief angle, plunging the grinding wheel below the cutting edge, and feeding the grinding wheel axially to grind both the cutting and compound relief angles simultaneously on the tool.

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**4,109,422**

## SANDER CLEANING PROCESS

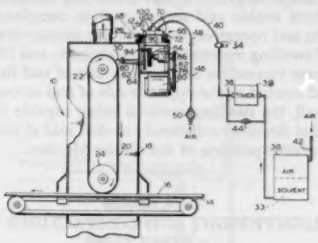
**James W. Parsons, Ashland, Oreg., assignor to Parsons Enterprises, Inc., Ashland, Oreg.**

**Continuation of Ser. No. 673,538, Apr. 5, 1976, abandoned, which is a continuation of Ser. No. 550,151, Feb. 18, 1975, abandoned, which is a continuation of Ser. No. 410,348, Oct. 29, 1973, abandoned, which is a division of Ser. No. 262,621, Jun. 14, 1972, Pat. No. 3,812,622. This application Sep. 30, 1977, Ser. No. 838,400**
**Int. Cl.[2] B24B *1/00, 21/18***
**U.S. Cl. 51—325** **4 Claims**

1. The method of cleaning an elongated, flexible strip having abrasive particles adhered to one face thereof and abrading therewith comprising:

advancing the strip continuously repeatedly in a predetermined direction along a predetermined path having straight portions and a pair of convex portions with the abrasive particles at the outside of the convex portions to alternately straighten and flex the strip so that the particles are alternately closed and spread apart,

abrading a workpiece with one of the convex portions of the strip,



and spraying a hydrocarbon solvent and air on the other convex portion of the strip travelling over the other convex portion of the path.

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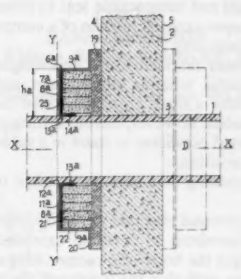
**4,109,423**

## FIRE-PROOF DEVICE FOR A TUBE OF FUSIBLE MATERIAL WHICH EXTENDS THROUGH A WALL

**Maurice Eugéne Perrain, Nancy, France, assignor to Pont-a-Mousson S.A., Nancy, France**

**Filed Apr. 5, 1977, Ser. No. 784,756**
**Claims priority, application France, Apr. 14, 1976, 76 10998**
**Int. Cl.[2] E04H *9/00*; F16K *13/00***
**U.S. Cl. 52—1** **9 Claims**



1. In a fire-proof device for a tube of fusible material extending through an aperture in a wall of a structure, comprising, in combination with said wall, means defining a case of a material which is substantially nondeformable under the effect of heat and mounted on said wall around the aperture, and means within the case for radially crushing the tube and closing off said aperture when the tube softens under the effect of a fire; the improvement wherein said tube crushing and aperture closing means comprise a mass of a material which is capable of swelling under the effect of heat and is enclosed within the case, the case comprising a front wall, a rear wall substantially parallel to the front wall, two substantially parallel first side walls interconnected by the front wall, and two second side walls interconnected by the front wall, the front wall defining an orifice substantially coaxial with said aperture and through which orifice the tube extends in use of the device, a shutter element movable between an inoperative position in which said orifice is fully open and a passage is allowed for the tube and an operative position in which said orifice and the tube are completely closed by the shutter element, the shutter element being of a material which is substantially non-fusible at service temperatures, that is to say the temperatures which are developed in the course of a fire and having a first part which is substantially planar and substantially perpendicular to a radial direction relative to the axis of the orifice and aperture and is mounted to be movable in said radial direction in the case

substantially in contact with said front wall and second side walls and a second part which lies alongside and is in contact with said front wall and has an extent in said radial direction and an extent in a direction perpendicular to said radial direction which enable said second part to completely close said orifice in said operative position of the shutter element, and the mass of swelling material being disposed in and filling that part of the case located on the opposite side of said first part to the tube and located on the opposite side of said second part to said front wall, the swelling material being capable of swelling in said radial direction sufficiently to shift said shutter element to said operative position of the shutter element.

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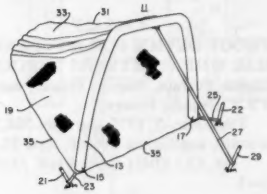
**4,109,424**
**LIGHTWEIGHT AND COMPACTIBLE TENT STRUCTURE**

**Gerald H. Block, 3111 Deakin St., Berkeley, Calif. 94705**

**Filed May 25, 1977, Ser. No. 800,567**
**Int. Cl.[2] E04B *1/345***
**U.S. Cl. 52—2** **9 Claims**



1. A lightweight and compactible tent structure for protecting at least the upper exposed portion of a camper's body, said tent structure comprising

a support member fabricated of a lightweight substantially flexible material wherein the support member can be compacted into a small volume suitable for storing, said support member, however, having sufficient rigidity in its non-compacted condition to stand in a substantially vertical upright position,

means for anchoring said support member to the ground, and

a protective surround attached to said support member and extending therefrom to form an extended end portion which engages the body of a camper who reposes in said tent structure such that the weight of the camper's body engaging said surround and the support provided by said anchored lightweight support member coact to hold said tent structure in a stable upright position.

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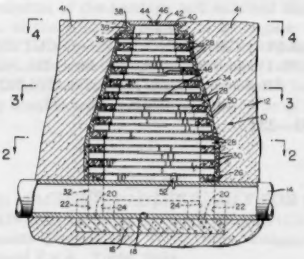
**4,109,425**
**CIRCULAR TYPE MANHOLES**

**John J. Carlessimo, 29800 W. Eight Mile Rd., Farmington Hills, Mich. 48024**

**Filed Dec. 13, 1976, Ser. No. 749,810**
**Int. Cl.[2] E02D *29/14***
**U.S. Cl. 52—21** **2 Claims**

1. A manhole well comprising a vertically disposed generally cylindrical tubular casing disposed in the ground and made of superimposed courses of regularly disposed bricks, said bricks having opposite side faces converging towards the interior of said casing and said bricks being united by means of motar, an open upper end portion for said casing, a removable lid normally obturating said upper end portion, said casing having a right cylindrical portion proximate the bottom thereof and a frusto-conical portion of progressively decreasing diameter disposed between said right cylindrical portion and said upper end portion, a ladder formed of a plurality of superimposed rungs made of generally U-shaped metal rods having ends set in the mortar uniting said bricks, a precast relatively massive base member made of concrete and permanently obturating the lower end of said casing, said base member having a groove formed proximate the periphery thereof for accepting the lower end portion of said casing, and means for hermetically sealing said lower end and said base member about said groove, wherein said base member has a transverse groove disposed on the upper surface thereof, said transverse



groove forming a saddle for a conduit disposed therein and projecting across said casing and wherein said casing is provided on its exterior surface with a coating of mortar extending to and engaged with said base member for forming at least in part said means for hermetically sealing said lower end of said casing and said base member about said groove.

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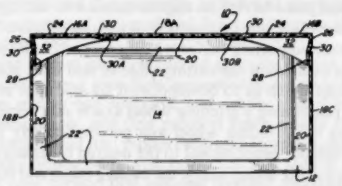
**4,109,426**
**TUB SURROUND**

**Michael J. Dobija, New Philadelphia, Ohio, assignor to Masonite Corporation, Chicago, Ill.**

**Filed Mar. 10, 1977, Ser. No. 776,130**
**Int. Cl.[2] A47K *3/16***
**U.S. Cl. 52—35** **2 Claims**



1. A tub surround comprising: first and second substantially identical corner sections, each including first and second legs aligned substantially perpendicular to each other and of unequal length, each said leg including a planar extending free end along the full height of each said corner section being offset relative to the plane of each such leg;

a first planar panel positioned between said corner sections defining a first wall, said first panel including first and second edges, each said first and second edge underlying one of said free ends;

a second planar panel positioned adjacent said first corner section defining a second wall, said second panel including an edge underlying another free end of said first corner section;

a third planar panel positioned adjacent said second corner section defining a third wall, said third panel including an edge underlying another free end of said second corner section;

said first, second and third panels being of substantially identical configuration and size; and

shelves on each said corner section extending between said first and second legs, said shelves defined on only a portion of the length of each said corner section, said shelves on said first corner section being defined on an upper portion of said first corner section and said shelves on said second corner section being defined on a lower portion of

said second corner section such that upon assembly of said tub surround said shelves on said first corner section are at a different level relative to a tub than the shelves on said second corner section.

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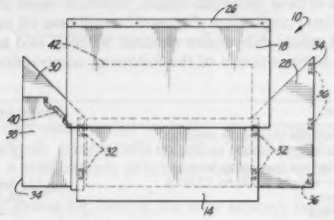
**4,109,427**

## FOLDABLE STRUCTURES CONSIDERED TO BE PRIMARILY USEFUL AS DOGHOUSES

**Edward D. O'Brian, 910 Iroquois St., Anaheim, Calif. 92801, and William M. Plachy, 3533 Encinitas Rd., San Marcos, Calif. 92069**

**Filed Dec. 20, 1976, Ser. No. 752,104**
**Int. Cl.[2] E04D *1/36;* E04B *1/344;* A01K *1/02***
**U.S. Cl. 52—58 R** **9 Claims**



1. A structure having spaced, parallel side walls, a bottom extending between said side walls, a top extending between said side walls, and parallel ends extending between said side walls in which the improvement comprises:

said top, said bottom, and each of said ends each including a set of two parts, the parts of said sets being located adjacent to one another so that each set extends between said side walls,

a first group of hinge means, each hinge means of said first group pivotally connecting a single part of each of said sets to one of said side walls, a second group of hinge means each hinge of said second group pivotally connecting the parts of each set midway between said side walls,

all of said hinge means of both groups which are secured to said top and said bottom having parallel axes,

said hinge means in said first and second groups permitting said structure to be folded between an expanded configuration in which said side walls are spaced from one another and a folded configuration in which said side walls are adjacent to one another,

said hinge means of said first and said second groups are located so as to permit said parts of said bottom to pivot upwardly between said sides when said structure is in said folded configuration and so as to permit said ends and said top to pivot outwardly from between said sides when said structure is in said folded configuration.

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**4,109,428**

## ROOF EDGING

**Raymond Joseph Aarons, Jindalee, Australia, assignor to Monier Colourtile Pty. Ltd., Darra, Australia**

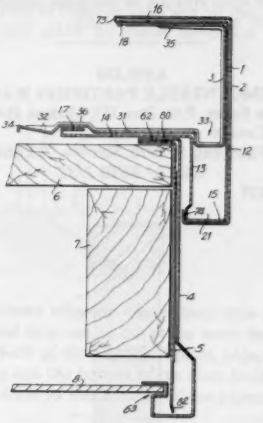
**Continuation-in-part of Ser. No. 687,702, May 19, 1976, abandoned. This application Oct. 6, 1977, Ser. No. 840,479**
**Int. Cl.[2] E04B *7/06;* E44D *3/40***
**U.S. Cl. 52—94** **6 Claims**

1. An edging strip assembly for tiled roofs comprising: a normally vertical face plate having a lower part and a vertical flange spaced therefrom, an upwardly-facing substantially rectangular channel formed between said lower part of said face plate and said vertical flange;

an upper tile-retaining flange extending rearwardly from an upper edge of said face plate to pass above edge tiles;

a lower tile-retaining flange extending rearwardly from an upper edge of said vertical flange to lie between said edge tiles and their tiling batten;

spaced attachment clips each including a horizontal arm passing between said lower flange and said edge tiles and



each clip being pre-engaged within said face plate and said upper flange and assembled as a unit with said face plate; and fastening means for securing said horizontal arm to the tiling batten.

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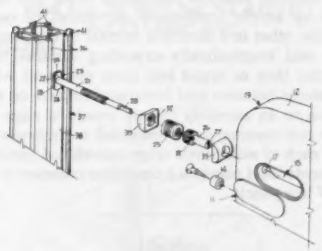
**4,109,429**

## PANEL ERECTION

**Hubert James Whisson, 89 King William Rd., Hyde Park, Australia (5061)**

**Filed Jun. 1, 1977, Ser. No. 802,417**
**Int. Cl.[2] E04C *3/32***
**U.S. Cl. 52—122** **8 Claims**



1. Means for the erection of a panel assembly wherein a panel member has a clamping hole extending inwardly from one edge thereof, a nut receiving cavity extending inwardly from a side face thereof and intersected by the clamping hole,

a threaded clamping member having a non-circular head at one end, the other end of said member extending into the hole, a nut positionable in the nut receiving cavity to be threadably engaged by the clamping member when located in the clamping hole, a rotation limit sleeve also positionable in the nut receiving cavity and having a non-circular aperture extending therethrough, and also having abutment means thereon which are engageable against abutment surfaces on the panel or means fixed relative to the panel, said other end of the threaded clamping member being a co-operating non-circular end slidable in said non-circular aperture, the limit sleeve being operable to limit rotation of said threaded clamping member to less than 180°,

and a post having flanges with inturned beads forming a narrow mouth channel extending along at least one side thereof, the space between the beads and the head shape and size being such that the head can be inserted into the channel but is restrained by the beads from withdrawal therefrom upon rotation of the head within the channel, through an angle of less than 180°.

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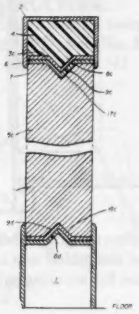
**4,109,430**

## DEMOUNTABLE PARTITION WALL

**Ronald George Fuller, P.O. Box 337, Hudson Heights, Quebec JOP IJO, Canada**

**Filed Aug. 9, 1976, Ser. No. 712,886**
**Int. Cl.[2] E04B *2/32***
**U.S. Cl. 52—127** **7 Claims**



1. An assembly of wall panels comprising a plurality of like panels assembled between a horizontal bottom runner and a horizontal top runner, wherein the vertical edges of said panels when standing each have longitudinally extending surfaces, each of said surfaces having at least two surfaces inclined one to the other to form a wedge shaped groove with an axis transverse the panel to permit an interlocking mating joint to be formed between adjacent like panels when said edges are interlocked by simple transitional movement of one panel relative to the other in a direction normal to the plane of the panels, the said longitudinally extending surfaces being arranged so that they ae urged into close abutment when said panel is centered between said horizontal runners on a centerline common to an assembly of said panels in edge to edge relationship and biassing means provided to impose a vertical force upon each of said panels when introduced between said runners to center said panel on a centerline common to the said assembly of like panels.

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**4,109,431**

## SEALING AND SPACING UNIT FOR MULTIPLE GLAZED WINDOWS

**Renato J. Mazzoni, Tarentum, and George H. Bowser, New Kensington, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

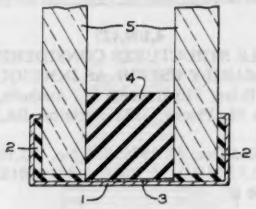
**Filed Mar. 25, 1974, Ser. No. 454,337**
**Int. Cl.[2] E06B *3/66***
**U.S. Cl. 52—172** **2 Claims**

1. A sealing and spacing unit for multiple glazed windows, comprising:

an elongated, flexible, moisture-impervious base;

an elongated, preformed, elastic spacer-dehydrator element having a preshaped cross-section adapted for insertion between opposed marginal edges of a pair of rigid, parallel sheets of a multiple glazed window, said spacer-dehydrator strip comprising a moisture vapor transmittable, polymeric matrix having finely divided particles of desiccant dispersed throughout the matrix;

a thin layer of a non-mastic adhesive which is solid and not cold flowable at room temperature for securing said spacer-dehydrator element to said base in a substantially continuous lengthwise manner; and




a strip of cold flowable, mastic, moisture vapor impervious, sealant composition disposed on said base on each side of said spacer-dehydrator element, wherein said mastic sealant composition is of the following composition:

| Ingredient | Percent by Weight |
|---|---|
| polyisobutylene (viscosity average molecular weight 75,000 to 125,000 | 15–50 |
| polyisobutylene (viscosity average molecular weight 5,000 to 15,000) | 10–45 |
| polybutene | 20–50 |
| carbon black | 10–45 |
| silica pigment | 5–15 |
| zirconium orthosilicate | 5–15 |
| zinc oxide | 0–5 |
| gamma-glycidoxy-propyltrimethoxysilane | 0–5 |

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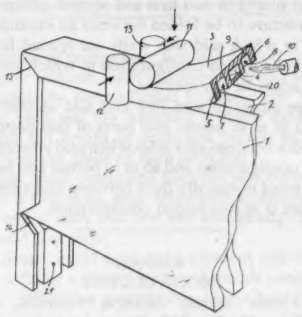
**4,109,432**

## MULTIPANE INSULATING GLASS PROCESS AND RIM STRIP

**Reiner Pilz, Hohenbachernstr. 4, 8051 Kranzberg, Fed. Rep. of Germany**

**Filed Jan. 13, 1976, Ser. No. 648,667**
**Claims priority, application Fed. Rep. of Germany, Jan. 13, 1975, 2501096**
**Int. Cl.[2] B32B *1/04;* E04B *2/28;* E06B *3/64***
**U.S. Cl. 52—172** **13 Claims**



1. In a multipane insulating glass having at least two panes and a composite rim strip holding the panes in spaced generally parallel relationship and sealingly overlying the edges of the panes and having a diffusion impermeable metallic layer and an adhesive layer adhering the composite rim strip to the space generally parallel panes, the improvement wherein the composite rim strip comprises an extruded plastic untiary structural body having a transverse profile for structurally holding the panes in said spaced generally parallel relationship wherein said diffusion impermeable metallic layer is embedded in and surrounded by said structural body and wherein said adhesive

layer comprises a heat melting adhesive anchored to the plastic profile by being pressure extruded jointly therewith.

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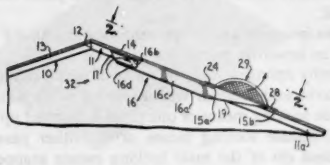
**4,109,433**

## BELOW ROOF VENTILATOR

Perry V. Maze, 701 Morton, Falls City, Nebr. 68355

Filed Jul. 13, 1977, Ser. No. 815,188
Int. Cl.[2] E04D *13/03*
U.S. Cl. 52—199 16 Claims



1. In a roof construction including a plurality of downwardly inclined, substantially parallel, spaced-apart rafters supporting a roof surface structure which rises to a highest roof level or ridge,

ventilator means for venting the zone beneath the roof surface construction, comprising, in combination:

the roof surface construction having an opening therethrough and therein spaced downwardly from said ridge, said opening positioned between two adjacent rafters, extending substantially from one of said rafters to the other, laterally, and being of substantially rectangular shape,

an elongate duct of a width substantially that of the distance between the two said adjacent rafters positioned and closely fitting therebetween under the roof surface structure above said opening, said duct of substantially rectangular transverse cross-sectional shape,

the upper, open end of said duct spaced downwardly from the underside of the roof ridge so that air from the zone under the roof surface structure adjacent the ridge may enter the upper end of the duct,

the lower end of the duct extending substantially to the upper edge of the roof surface opening, and

a wedge-form discharge trough positioned within the roof surface opening of substantially inverted right triangle configuration in longitudinal axial section,

said trough having a substantially rectangular bottom wall connected at its upper end to the bottom wall of the duct and having its lower end overlying the roof surface opening lower edge, whereby to underlie in its length the said roof surface opening, and two side walls of substantially inverted right triangular configuration connected at their lower edges to the side edges of the trough bottom wall and having their upper edges extending out the said roof surface opening closely adjacent the side edges thereof, whereby the said wedge-form discharge trough formed by the said three walls fills the said roof surface opening and completely underlies same,

and means fixing said duct and trough under said roof surface, between said rafters and within and under said roof surface opening, whereby air entering the upper end of the duct under pressure will travel downwardly within said duct and out said trough.

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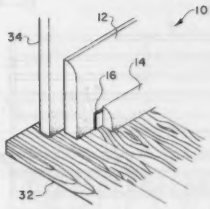
**4,109,434**

## MODULAR BASEBOARD MOLDING

Lawrence F. Katzin, 1414 Scales St., Raleigh, N.C. 27608

Filed Feb. 11, 1977, Ser. No. 767,793
Int. Cl.[2] E04C *2/38*
U.S. Cl. 52—287 7 Claims

1. A modular baseboard molding comprising; an elongated basebord plank having at least a front, a back, a bottom, and two encs; an elongated shoe molding strip having at least a front, a back, a bottom and two ends, the back of said strip lying juxtaposed to the front of said plank with the bottoms of said strip and plank lying substantially in the same plane; and an elongated strip of adhevise type tape for movably fastening said strip to said plank for planar movement between said



juxtaposed surfaces whereby one or both ends of said juxtaposed plank and strip can be cut at the same time for proper fitting of the back of the baseboard plank adjacent a wall or other structure and the bottom of the shoe mold strip can be moved to conform to the contour of the adjacent floor surfaces.

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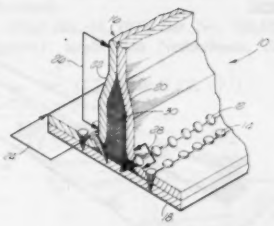
**4,109,435**

## COMPOSITE STRUCTURAL JOINT AND METHOD OF FABRICATION THEREOF

Morris S. Loyd, Northridge, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Aug. 26, 1977, Ser. No. 828,122
Int. Cl.[2] E04C *2/02*
U.S. Cl. 52—309.1 17 Claims



1. A reinforced composite structure comprising:

a staged composite panel, said panel having a plurality of fiber composite plies, said plies being adhesively bonded together;

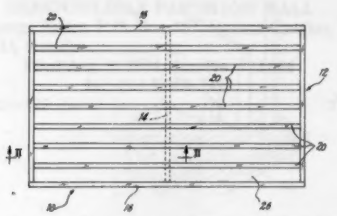
a staged composite web, said web having at least one sheet of fiber composite material, said sheet having at least one layer, said sheet having three portions, a first portion positioned parallel to said panel, a second portion positioned transversely to said panel, and a fillet portion between said first and second portions; and

a plurality of quills infixed in said fillet portion and said panel, said quills having barbs thereon, said barbs engaging the fibers of said panel and said web, said quills joining said fillet portion to said panel whereby said panel and said web can be co-cured as assembled.

## 4,109,436
## REINFORCED FOAM BUILDING PANEL ELEMENT

Adrien Berloty, 15, Boulevard du Chateau, 92200 Neuilly S. Seine, France

Filed Nov. 10, 1975, Ser. No. 630,606
Claims priority, application France, Nov. 27, 1974, 74 38828
Int. Cl.[2] E04C 2/22
U.S. Cl. 52—309.2 9 Claims



1. A building panel element comprising
(a) a rigid block of insulating foam having two opposed major surfaces and thickness between said surfaces;
(b) a peripheral frame enclosing said foam block substantially from one said major surface to the other;
(c) a plurality of spaced rectilinear thin strip members arranged on one side of said peripheral frame and embedded in said foam block substantially flush with one of said major surfaces and spaced from the other of said major surfaces, each of said strip members being adapted to receive and hold fastening means and to assist in rigidifying said foam block, said foam filling the spaces between said strip members;
(d) said insulating foam contributing substantially to the rigidity of said building panel element.

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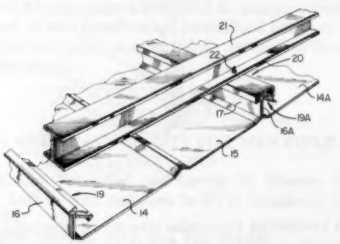
## 4,109,437
## BUILDING PANEL

Wayne H. Player, Mesquite, and Forris W. Barton, Jr., Grand Prairie, both of Tex., assignors to Howmet Corporation, New York, N.Y.

Filed Mar. 30, 1977, Ser. No. 782,768
Int. Cl.[2] E04D 1/06
U.S. Cl. 52—536 8 Claims



1. A roofing panel especially adapted for installation on the underside of a roofing framework comprising:
a generally planar elongated member having upstanding webs along its long sides;
one of said webs being provided with a female mounting and locking means oriented outboard of said web;
said female mounting and locking means comprising:
an integral flange formed at the top of its web into an inwardly extending narrow scabbard having a mouth substantially as wide as two thicknesses of panel forming material;
an outwardly extending substantially planar leg positioned parallel to the surface of said planar member and adapted for abutment against the underside of a ceiling framework member, thereby providing for application of a fastener connecting said roofing panel to said framework member;
and a downwardly extending leg spaced from and substantially parallel to said web, said downwardly extending leg terminating in an inwardly oriented detent rib;
said male locking means comprising:
an integral flange formed at the top of its web into an outwardly extending narrow blade having a thickness substantially equal to two thicknesses of panel forming material;
and an inwardly and downwardly extending leg terminating in an inwardly oriented detent rib;
whereby upon assembly of a pair of said roofing panels into interlocked relation with adjacent webs juxtaposed, the male locking means of one panel is inserted upwardly into the female locking means of the other panel with the detent rib of the male locking means snapped past and above the detent rib of the female locking means and with the narrow blade of the male locking means inserted into the narrow scabbard of the female locking means, and whereby during said assembly, energy for inserting said blade into said scabbard is momentarily stored as spring energy in the flexure of said downwardly extending legs of said male and female locking means.

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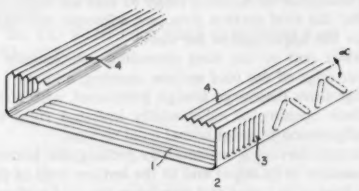
## 4,109,438
## REINFORCED SEPARABLE SECTIONAL HERMETIC PROTECTIVE COVERING

Francisco De la Concha, Emerson No. 116, Colonia Polanco, Mexico City, Mexico

Filed Sep. 4, 1974, Ser. No. 502,660
Claims priority, application Mexico, Aug. 31, 1973, 145890
Int. Cl.[2] E04C 2/32
U.S. Cl. 52—630 3 Claims



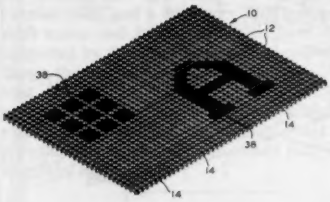
1. A modular member which may be used individually or together with like members joined together to provide a separable reinforced hermetic covering comprising a generally longitudinally extending main portion, a plurality of corrugations extending transversely of said main portion adjacent at least one end thereof and stopping short of the opposite sides of said main portion, said main portion extending to a bend free of corrugations at each side thereof beyond the extent of said transversely extending corrugations, integral flange portions extending generally at from about 90°–135° to said main portion from said bend, a plurality of corrugations extending in said flange portion at about 90°–135° to said main portion and in the vicinity of at least one end of said flange portion, said corrugations in said flange portion stopping short of opposite sides thereof, each of said flange portions extending to a bend free of corrugations beyond the extent of the corrugations of said flange portions and continuing to an inwardly directed portion generally parallel to and overlying said main portion, said inwardly directed portions each having a plurality of corrugations in its surface extending longitudinally for the length of the respective inwardly directed portion and perpendicularly to said corrugations in said main portion.

4,109,439

## FLOOR MAT HAVING INTERCHANGEABLE DESIGN ELEMENTS

James E. Feasel, Fort Wayne, Ind., assignor to The Airomat Corporation, Fort Wayne, Ind.

Filed Jun. 20, 1977, Ser. No. 808,098
Int. Cl.[2] E04C *2/42*
U.S. Cl. 52—667 10 Claims



1. A mat comprising:

a plurality of parallel flexible first strips and a plurality of parallel flexible second strips extending transversely to and intersecting said first strips so as to form a grid of readily deformable grid squares each comprising a quadrilateral interstitial space bordered by an adjacent pair of said first strips and an adjacent pair of said second strips,

a plurality of interchangeable insert element means disposed respectively within various of said interstitial spaces, and

means associated with said insert element means and the strips bordering their respective said interstitial spaces for removably locking said insert element means in their respective said spaces.

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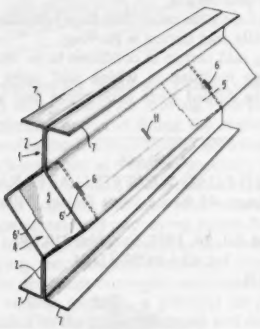
4,109,440

## STRUCTURAL SECTION

David Hewitt Bill, 65 Laburnam Street, Blackburn, Victoria, Australia (3130)

Filed Oct. 5, 1976, Ser. No. 729,789
Int. Cl.[2] E04C *3/30*
U.S. Cl. 52—721 12 Claims



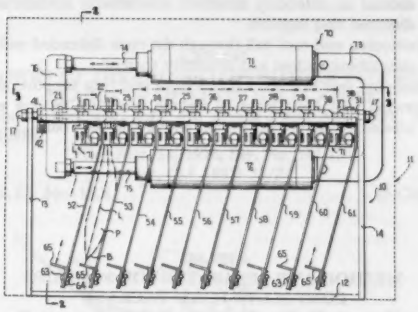
1. The combination of a structural section and a connector plate, said structural section comprising two similarly profiled metal sections joined together to define a central box-section, and a plurality of spaced stiffener members located within the box-section to render the box-section substantially rigid, said structural section including two substantially flat mating portions located adjacent to said box-section and said connector plate being formed to engage the surface of one of the mating portions of the structural section as well as said box-section thereof so that loads applied to said structural section through said connector plate are transferred from said one mating portion to said box-section.

4,109,441

## SEALING UNIT FOR AUTOCLAVE STERILIZATION OF FLEXIBLE PACKAGES

Fred B. Shaw, Hinsdale, Ill., assignor to Continental Can Company, Inc., New York, N.Y.

Division of Ser. No. 569,938, Apr. 21, 1975, Pat. No. 3,991,543.
This application Jul. 19, 1976, Ser. No. 706,375
Int. Cl.[2] B65B *31/02, 55/18*
U.S. Cl. 53—11 16 Claims



1. A method of sterilizing contents disposed in open mouthed pouches formed of heat sealable material, said method comprising the steps of gripping each of a plurality of pouches at opposite lateral edges adjacent an open mouth thereof, housing the thus gripped pouches in a chamber, introducing a heated sterilizing media into the chamber with the pouch contents being rendered sterile and the pouches being heated to a sealing temperature, and while the pouches are still housed in the chamber sequentially closing each pouch mouth and automatically hermetically sealing each pouch whereby contents contamination is precluded upon the removal of the pouches from the chamber.

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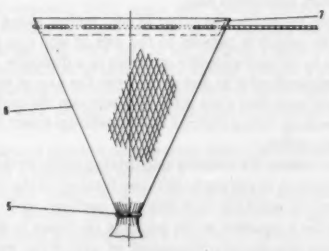
4,109,442

## METHOD OF TREATING PLANTS AND MEANS TO BE USED IN THIS CONNECTION

Pieter Cornelis Maasbach, Gerard Scholtenstraat 125a, Rotterdam, Netherlands

Filed Jan. 18, 1977, Ser. No. 760,410
Claims priority, application Netherlands, Jan. 22, 1976, 7600654
Int. Cl.[2] B65B *43/08, 67/12*
U.S. Cl. 53—29 3 Claims



1. A method of treating plants for purpose of transport and storage wherein the root section of the plant to be treated together with earth forming a ball is enveloped by a fabric of organic consumable material, comprising:

threading a plurality of draw cords on peripheral courses through the side wall of a length of tubing formed of flexible organic consumable material, the draw cords

being in substantially equal-length increments along the length of said tubing;

cutting said tubing on transverse planes substantially parallel to and spaced from said cords to provide a plurality of tubing sections having said cord woven therethrough adjacent a first end and being open adjacent a second, opposite end;

cinching said wall at said second end to provide a centralized closure for each of said sections;

distending said first end of one of said sections over and around an exteriorly mounted substantially horizontally disposed ring support;

positioning said root ball through the open distended end of said tubing section and interiorly thereof;

removing said first section end from said ring support; and

drawing said draw cord to tighten said first section end around the stem of the plant above said root ball.

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**4,109,443**

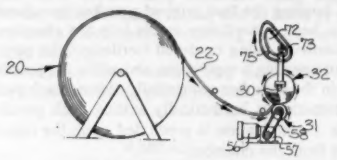
## METHOD AND APPARATUS FOR FORMING CONVOLUTE FOAM PACKAGE

**Allen Cameron Findlay, Davidson, N.C., assignor to Reeves Brothers, Inc., New York, N.Y.**

**Filed Jan. 29, 1976, Ser. No. 653,483**

**Int. Cl.[2] B65B *49/00*; B65H *17/06*; B65B *63/04***

**U.S. Cl. 53—118** **17 Claims**




8. An apparatus for winding an elongate web of flexible foam sheet material or the like into a highly compact convolute package having substantially uniform layer to layer compression within predetermined limits consistent with the desired compression of the overall package and without detrimental over-compression of any layers, said apparatus comprising

a frame,

a driving roller and a take-up roller, said take-up roller being adapted to have the web convolutely wound thereon to form a convolute package,

means mounting one of said rollers on said frame to define a fixed horizontal axis,

means mounting the other of said rollers along a horizontal axis which is parallel to the axis of said one roller and so as to be operationally movable in a direction substantially perpendicular to and away from the axis of said one roller and such that a nip is formed between the periphery of the package being formed on the take-up roller and the driving roller,

drive means for rotating said driving roller to thereby impart rotation to the package being formed on the take-up roller and to wind the web onto the package, and such that the rollers separate as the package increases in size, and

means operatively connected to said drive means and engageable with the opposite ends of said other roller for controlling the separation of the rollers to a predetermined amount substantially less than the thickness of the web upon each rotation of the package, to thereby control the compression of the package layers and achieve substantially uniform layer to layer compression within said predetermined limits.

**4,109,444**

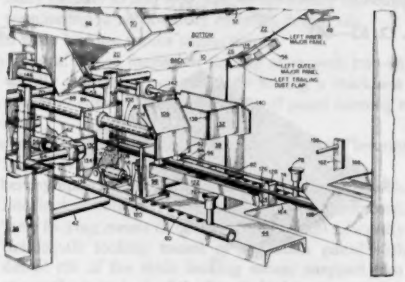
## HORIZONTAL CARTONING MACHINE

**Richard G. Lee, 780 Boylston St., Boston, Mass. 02109**

**Filed Apr. 4, 1977, Ser. No. 784,572**

**Int. Cl.[2] B65B *43/28***

**U.S. Cl. 53—186** **12 Claims**



9. A machine for erecting a collapsed four sided tubular carton to rectangular loading condition, said carton comprised of a top and bottom with panels extending therefrom and a front and back with dust flaps extending therefrom, said machine comprising

a magazine for holding a quantity of collapsed cartons,

means moveable up and down for gripping the bottom of the lowermost carton in said magazine and for moving said carton down to a predetermined carton loading position,

means located in the downward path of travel of said carton to engage said back and progressively cause said back and front to be moved to vertical position by the time said predetermined loading position has been reached,

means operable while said carton is stationary at said loading position for spreading the panels at one end of said carton and for folding in the dust flap of said back at said one end,

subsequently operable means for spreading the panels at the other end of said carton and for folding in the dust flap of said back at said other end while said carton is still stationary at said loading position,

means for moving said carton along a path at right angles to the tubular axis of said carton for a distance greater than the width of said carton,

and means for closing the other dust flaps extending from the said front while said carton is moving,

thereby placing said carton in condition to be received by a carton sealing machine in which said outer and inner panels will be folded over each other and secured together.

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**4,109,445**

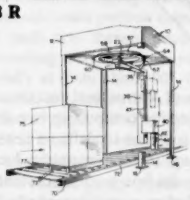
## OVERHEAD LOAD-WRAPPING APPARATUS

**Michael H. Shulman, 45 Bruce Farm Drive, Willowdale, Ontario, Canada**

**Filed Jul. 26, 1977, Ser. No. 819,130**

**Int. Cl.[2] B65B *13/04***

**U.S. Cl. 53—198 R** **5 Claims**



1. An apparatus for wrapping a film around a palletized load, comprising:

a frame,

support means for supporting the frame spaced vertically above a location adapted to receive the palletized load,

vertical shaft means supported by the frame, and motive

means for rotating the shaft means with respect to the frame,

an arm secured to the shaft means and extending away therefrom substantially horizontally such that the arm and the shaft means rotate together,

a member affixed to the arm and extending downwardly therefrom at a location spaced from the shaft means,

means connected to the said member for supporting a roll of film such that the film can pay out to enwrap the load as the rotating arm carries the roll around the load on a circular path, and a stationary ring concentric with the shaft means and located above the arm, the ring being supported by the frame having a substantially horizontal flange, the arm including bracket means which supports at least one roller for free rotation about a substantially horizontal axis intersecting the axis of said shaft means, the roller running on the upper surface of said flange to support the arm against the downward pull exerted by the weight of the member.

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**4,109,446**

## APPARATUS FOR FILLING AND CROWNING BOTTLES

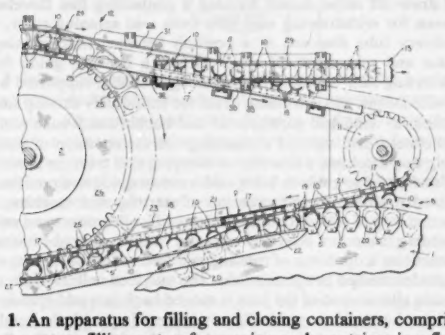
**Hans Güenther Krohn, Dortmund-Kirchorde; Friedrich Rademacher, Kamen, both of Fed. Rep. of Germany; Ulrich Petri, and Hans D. Deubel, both of Elm Grove, Wis., assignors to H & K, Inc., New Berlin, Wis.**

**Filed May 10, 1977, Ser. No. 795,390**

**Claims priority, application Fed. Rep. of Germany, Feb. 19, 1977, 2707307**

**Int. Cl.² B65B *3/00***

**U.S. Cl. 53—282** **12 Claims**



1. An apparatus for filling and closing containers, comprising a rotary filling means for moving each container in a first generally circular path and filling the container with liquid; rotary crowning means synchronized with the filling means for moving each container in a second generally circular path and applying a crown to each filled container; a discharge conveyor located adjacent the crowning means for discharging crowned containers; and conveying means for conveying the containers from the filling means to the crowning means and for conveying the crowned containers from the crowning means to the discharge conveyor, said conveying means comprising an endless member, a plurality of generally curved pockets carried by the endless member and disposed to receive and hold individual containers, a drive member operably connected to the endless member and mounted on the crowning means and disposed to rotate in synchronization therewith to thereby drive the endless member, an idler member connected to the endless member, said endless member disposed to move in a first generally linear path of travel from the idler member to the drive member with said path of travel being generally tangential to the circular path of travel of the containers on the filling means, whereby the containers are transferred from the filling means to said pockets, said endless member being disposed to move in a second generally linear path of travel from the drive member toward the idler member, said second path of travel being disposed at an angle to the direction of movement of the discharge conveyor, and transfer means for transferring the containers from the pockets to the discharge conveyor as said endless member moves along said second path of travel.

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**4,109,447**

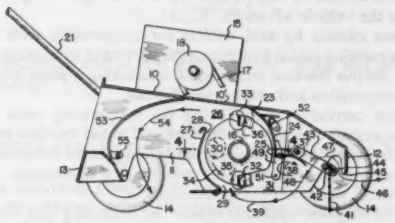
## MOWER OF THE CROSS-FLOW BLOWER TYPE WITH BLADES OF OPPOSITE HELIX ANGLE

**Hugo S. Ferguson, R.D. #2, Averill Park, New York, N.Y. 12180**

**Filed Nov. 11, 1976, Ser. No. 741,132**

**Int. Cl.² A01D *35/24***

**U.S. Cl. 56—13.3** **15 Claims**



1. A mower of the cross-flow blower type comprising

(a) a carriage,

(b) a cylindrical rotor mounted on said carriage with the axis thereof substantially horizontal and extending laterally of the carriage,

(c) said rotor having a plurality of sections along the axis thereof with a plurality of circumferentially-spaced approximately helical fixed blades in each section moving in the same path of travel and spaced from the rotor axis to leave the major portion of the interior of the rotor free for air flow through the rotor transversely thereof,

(d) motor means for driving said rotor in a rotational direction such that the lower blades move in the normally forward direction of travel of the mower,

(e) the outer leading edges of the blades being sharp to form cutting edges,

(f) predetermined blades of at least two adjacent sections being of opposite helix angle and having cutting edges which overlap in the axial direction and are angularly spaced about the rotor axis in the overlap region thereof,

(g) the cross-section of said blades having at least a portion on the leading side thereof which slopes backwardly and inwardly with respect to the direction of rotation of the rotor,

(h) and a blower conduit cooperating with said rotor to form therewith a cross-flow blower,

(i) said conduit comprising upper and lower wall sections extending laterally along the length of the rotor and having respective portions close to the rotor at circumferentially spaced positions separating inlet and outlet regions of the blower,

(j) said inlet region opening downwardly and forwardly with a portion of the rotor therein exposed to material to be mowed,

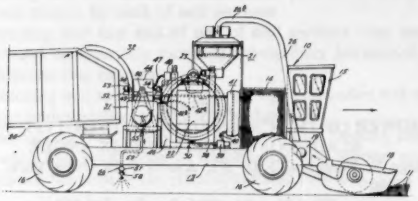
(k) the portions of the mower adjacent the rotor being nonshearingly spaced from the path of travel of said blades.

**4,109,448**

## METHOD AND APPARATUS FOR IN-FIELD PROCESSING OF VEGETATION

**Donald C. Kline, Allentown, Pa., assignor to Schoeneck Farms, Inc., Nazareth, Pa.**

**Filed Aug. 11, 1976, Ser. No. 713,349**
**Int. Cl.[2] A01D *43/00***
**U.S. Cl. 56—13.5** **23 Claims**



**11.** Apparatus for field processing vegetation, comprising:
a vehicle adapted to travel through a field of vegetation,
means carried by said vehicle for harvesting the vegetation as the vehicle advances,
means carried by said vehicle for cooperating with said harvesting means to separate the harvested vegetation into a fibrous fraction and a liquid containing a plant protein composition and other compositions,
means carried by said vehicle for cooperating with said separating means to fractionate said liquid fraction into a first component containing said plant protein composition and a second substantially protein free component containing said other compositions,
means movable with said vehicle for collecting said fibrous fraction and said plant protein composition, and
means carried by said vehicle for applying said other compositions onto the field as the vehicle advances,
whereby the second liquid component is discarded during harvesting and processing of the vegetation.

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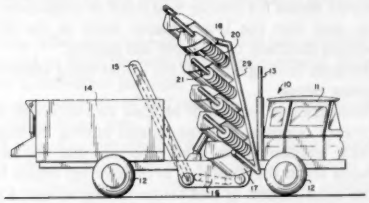
**4,109,449**

## FRUIT PICKING APPARATUS

**Otto L. Gibson, 1776 6th St. NW., Winter Haven, Fla. 33880**

**Filed Jun. 23, 1976, Ser. No. 698,852**
**Int. Cl.[2] A01D *46/24***
**U.S. Cl. 56—328 R** **17 Claims**



**1.** A fruit picking apparatus comprising in combination:
an elongated boom having an elongated rotatable shaft mounted thereto;
a plurality of rotatable fruit twisting members mounted on said rotatable shaft of said boom to rotate with said shaft, each said rotatable fruit twisting member having a fruit twisting surface thereon;
a plurality of fruit engaging members mounted to said boom, at least one fruit engaging member being mounted adjacent each rotatable fruit twisting member whereby fruit can be engaged between a rotatable fruit twisting member and a fruit engaging member for twisting fruit from its stem; and
a stabilization bar mounted parallel to said rotatable shaft on said elongated boom and coupled to each fruit engaging member to prevent the rotation of said fruit engaging member on said rotatable shaft.

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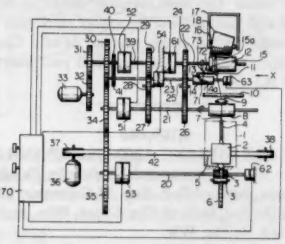
**4,109,450**

## OPEN-END SPINNING MACHINE AND A METHOD OF RESTARTING THE SAME

**Yoshiaki Yoshida; Osamu Suzuki, both of Obu, and Keizi Onoue, Kariya, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Aichi, Japan**

**Filed Apr. 18, 1977, Ser. No. 788,283**
**Int. Cl.[2] D01H *15/00, 1/12***
**U.S. Cl. 57—34 R** **13 Claims**



**1.** A method of restarting an open-end spinning machine comprising: feed rollers for supplying fibers to a combing roller so as to comb the fibers, a spinning rotor for collecting said combed fibers into a yarn and for twisting said yarn, a pair of draw off roller means forming a contacting line therebetween for withdrawing said yarn from said spinning rotor, a delivery tube disposed at a position between said spinning rotor and said draw off roller means, a traverse guide for traversing said withdrawn yarn along a bobbin supported by cradle means, and a winding drum for frictionally driving said bobbin to wind said yarn around said bobbin and form a conical cheese, said method comprising: on the occasion of stopping said machine, a first step of stopping said traverse motion of said traverse guide to bring said traverse quide to a predetermined position; on the occasion of starting said machine, a second step of rotation both said draw off roller means and said winding drum in a direction opposite to their normal rotating directions; a third step of rotating said feed rollers according to a predetermined program so that the said feed rollers begin to rotate after an end of the yarn is moved back into said spinning rotor where said moved back yarn is pieced up with the newly spun yarn; a fourth step of rotating both said draw off roller means and said winding drum in their normal rotating directions, and starting the traverse motion of said traverse guide so as to move said traverse guide toward a smaller diameter portion of said conical cheese along the axis of said conical cheese when the pieced joint formed between said end of the yarn and said newly spun yarn reaches said contacting line formed between said draw off roller means.

**4.** An open-end spinning machine comprising:
feed rollers, for supplying fibers to a combing roller so as to comb the fibers;
a spinning rotor for collecting said combed fibers into a yarn and for twisting said yarn;
a pair of draw off roller means forming a contacting line, for withdrawing said yarn from said spinning rotor, having a first means for engaging with and disengaging from a main power source;
a traverse guide for traversing said withdrawn yarn along a bobbin supported by cradle means, said traverse guide being connected to a second means for engaging with and disengaging from said main power source;
a winding drum, for frictionally driving said bobbin to wind said yarn around said bobbin and form a conical cheese, connected to said draw off rollers means by way of transmitting means, and;

controlling means, for controlling the above-mentioned two means according to a predetermined program, by which, on the occasion of stopping said machine, said traverse guide is stopped at a predetermined position and, on the occasion of restarting said machine, said traverse guide is restarted so as to move toward a smaller diameter portion of said conical cheese when a pieced joint formed between an end of said yarn and a newly spun yarn reaches said contacting line formed between said draw off roller means.

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**4,109,451**

## METHOD AND DEVICE FOR REMOVING IMPURITIES FROM A SPINNING ROTOR OF AN OPEN-END SPINNING APPARATUS

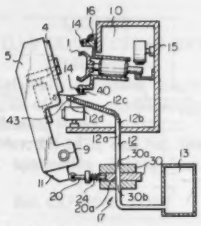
**Yasuo Yamada, Kariya; Kazuo Kamiya, Nishio; Iwao Katayama, Chita; Kozo Motobayashi, Nishikasugai, and Yoshiaki Yonemura, Nagoya, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Japan**

**Filed May 5, 1977, Ser. No. 793,968**

**Claims priority, application Japan, May 8, 1976, 51-51687**

**Int. Cl.[2] D01H *11/00***

**U.S. Cl. 57—56** **7 Claims**



3. In an open-end spinning apparatus provided with a spinning rotor and a rotor housing wherein said spinning rotor is rotatably disposed in said rotor housing, a frame body for forming a spinning chamber together with said rotor housing, a combing roller rotatably disposed in said frame body, and a machine frame whereon said frame body is displaceably mounted, a device for removing impurities from said spinning rotor comprising a receiving plate supported by a part of said frame body at a position where, when said frame body is displaced from said rotor housing so that an opening of said rotor housing is created, a part of a space formed at a position ajdacent to said opening can be occupied by said receiving plate, said receiving plate provided with a slit, a suction conduit being connected to said slit of said receiving plate, a suction source connected to said suction conduit, a mechanism for selectively connecting or disconnecting the connection between said suction conduit and said suction source in relation to the motion of changing the disposition of said frame body, whereby, when said frame body is displaced from the engaged position with said rotor housing to a position for cleaning said spinning rotor, said suction conduit is connected to said suction source, while said suction conduit is disconnected from said suction source during a period when said frame body is engaged with said spinning rotor.

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**4,109,452**

## SPINNING ROTOR UTILIZED FOR AN OPEN-END SPINNING APPARATUS

**Akira Kobayashi, Obu; Kunji Chiba, Kariya; Noriaki Miyamoto, Kariya; Masao Shiraki, Kariya, and Naotake Furukawa, Higashiuramachi, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Japan**

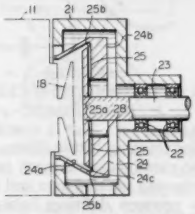
**Filed Apr. 13, 1977, Ser. No. 787,026**

**Claims priority, application Japan, Apr. 17, 1976, 51-43921**

**Int. Cl.[2] D01H *1/12***

**U.S. Cl. 57—58.89** **5 Claims**

1. In an open-end spinning apparatus provided with a fiber feed mechanism, means for separating a bundle of fibers supplied from the fiber feed mechanism into individual fibers, a rotatable spinning rotor for receiving individual fibers delivered from said separating means, means for taking up a yarn formed in said spinning rotor and a yarn guide means for introducing said yarn from said spinning rotor to said takeup means; the improvement wherein said spinning rotor comprises, in combination, a fiber collecting zone formed at an inside wall position having a maximum lateral diameter with respect to a rotational axis thereof, means for discharging air separated from said deposited fibers from inside the chamber of said spinning rotor to a position outside said rotor and means for continuously blowing a plurality of air streams directly toward said fiber collecting zone from a region peripheral to



said rotational axis of said spinning rotor, while said rotor is operating.

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**4,109,453**

## FIBER SEPARATING DEVICE OF AN OPEN-END SPINNING APPARATUS

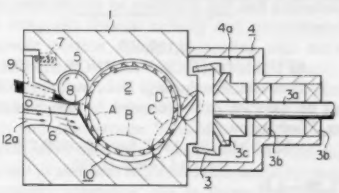
**Akira Kobayashi, Obu; Kunji Chiba, Kariya; Noriaki Miyamoto, Kariya; Masao Shiraki, Kariya, and Naotake Furukawa, Aichi, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Japan**

**Filed Apr. 20, 1977, Ser. No. 789,029**

**Claims priority, application Japan, Apr. 26, 1976, 51-48327; May 6, 1976, 51-51522**

**Int. Cl.[2] D01H *1/12***

**U.S. Cl. 57—58.91** **10 Claims**



1. An improved fiber separating device disposed in a casing of an open-end spinning apparatus, comprising in combination:

a fiber-bundle supply mechanism and a spinning rotor for forming a yarn from individual fibers separated from said bundle of fibers supplied by said supply mechanism;

a combing roller rotatably disposed in said casing at a position adjacent to said fiber-bundle supply mechanism for separating said bundle of fibers into said individual fibers;

a fiber carrying passage formed in said casing at a position between said fiber-bundle supply mechanism and said spinning rotor in such a condition that a part of a cylindrical surface of said combing roller is positioned therein so that said separated individual fibers are carried through said fiber carrying passage to said spinning rotor;

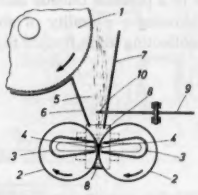
said fiber carrying passage being provided with a combing section formed at an upstream position thereof, said combing section having a length substantially identical to an average fiber length of material fiber, and;

auxiliary combing means for facilitating the transfer of said individual fibers separated from said bundle of fibers to a part of the cylindrical surface of said combing roller in said combing section.

## 4,109,454
## APPARATUS FOR TWISTING TEXTILE FIBERS

Ernst Fehrer, and Franz Konig, both of Linz, Austria, assignors to Dr. Ernst Fehrer Gesellschaft m.b.H. & Co. K.G. Textilmaschinenfabrik u. Stahlbau, Linz, Austria

Filed Jun. 3, 1977, Ser. No. 803,227
Claims priority, application Austria, Jun. 21, 1976, 4513/76
Int. Cl.[2] D01H *1/12*
U.S. Cl. 57—58.95 9 Claims

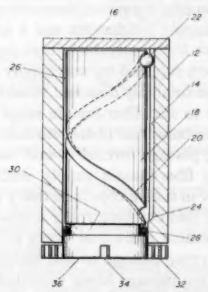


1. Apparatus for spinning textile fibers,
comprising two closely spaced apart, perforated
suction drums having parallel axes and confronting peripheral surface portions defining between them a region which is triangular in cross-section and adapted to receive fibers flying through a flight region which precedes said triangular region in a direction that is transverse to said axes,
suction means operable to provide a suction zone in each of said confronting peripheral surface portions,
said drums being operable to rotate in the same sense so that fibers received in said triangular region and attracted to said suction zones by the operation of said suction means are twisted together by said drums to form a yarn,
said apparatus comprising further
yarn-withdrawing means operable to withdraw said yarn from said triangular region toward one end thereof while holding said yarn against rotation, and
a throwing member which is operable to move in said flight region toward said one end thereof in a plane which is transverse to said direction.

## 4,109,455
## SPIRAL ORIFICE DASHPOT TIMER

Alexey T. Zacharin, Parsippany, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 26, 1977, Ser. No. 800,775
Int. Cl.[2] G04F *13/00*
U.S. Cl. 58—1 R 3 Claims

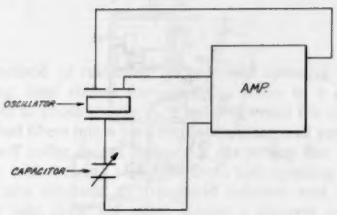


1. A dashpot timer comprising;
a cylindrical housing;
a close-fitting, concentric shaft positioned within said housing and rotatable relative thereto;
a spiral, semi-circular groove on the shaft exterior and a semi-circular groove on the housing interior, thereby forming a circular raceway and communicating with both ends of said shaft and said housing;
a sphere movably positioned in said raceway;
a viscous fluid filling the space between the shaft and the housing;
means for rotating the shaft relative to said housing;
whereby movement of the sphere in said raceway produced by rotation of the shaft relative to the housing forces the viscous fluid to flow through the orifice formed between the sphere and said raceway, thereby delaying said rotation and providing a timing action.

## 4,109,456
## CERAMIC CAPACITOR

Kuniharu Yamada, and Katsuhiro Teraishi, both of Suwa, Japan, assignors to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Continuation-in-part of Ser. No. 472,012, May 21, 1974, abandoned. This application Jul. 7, 1975, Ser. No. 593,343
Claims priority, application Japan, May 21, 1973, 48-56568
Int. Cl.[2] G04C *3/00*
U.S. Cl. 58—23 AC 5 Claims




1. An improved temperature compensating capacitor comprising a ceramic including at least 90 mol % of an admixture of $BaTiO_3$ and $BaSnO_3$, the content of $BaTiO_3$ lying between 80.7 and 84.0 mol % and the content of $BaSnO_3$ lying between 10.0 and 14.0 mol %, and the remainder of the ceramic composition containing at least one oxide selected from a first group consisting of $SrTiO_3$, $CaSnO_3$, $CaTiO_3$ and $MgTiO_3$ in an amount from 1.7 to 7.0 mol % and at least one oxide selected from a second group consisting of $SiO_2$, $Fe_2O_3$, $MnO_2$, CoO, $V_2O_5$ and $CeO_2$ in an amount from 0.3 to 0.5 mol %, said capacitor having a Curie point lying within the ambient temperature range and having a change-rate of at least 30% between its Curie point and its Curie point ± 20° C, wherein the change-rate of said capacitor is defined as

$$\frac{C_0 - C_1}{C_0} \times 100\%,$$

$C_0$ being the capacity of said capacitor at its Curie point, and $C_1$ being the capacity of said capacitor at its Curie ± 20° C.

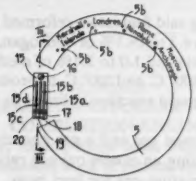
## 4,109,457
## UNIVERSAL ELECTRONIC TIMEPIECE

Claude Laesser, La Chaux-de-Fonds, and Hubert Portmann, Colombier, both of Switzerland, assignors to Ebauches S.A., Switzerland

Filed Nov. 8, 1976, Ser. No. 740,036
Claims priority, application Switzerland, Nov. 19, 1975, 15084/75
Int. Cl.[2] G04B *19/22*
U.S. Cl. 58—43 4 Claims

1. A universal electronic timepiece which displays the time-belts of the earth, comprising:
a movable indicator of the time-belts;
a bed of electric contacts spaced one from another each

having respective control members carried by a movable element moving in synchronism with said movable indicator, said contacts and said control members being spaced one from another such that the contacts are closed by said control members in a first order when said indicator is



moved in a first direction and closed in a second order when said indicator is moved in a second opposite direction; and

a display device including means for displaying the time in a first time-belt and second means for displaying the time of the time-belt selected by said movable indicator.

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**4,109,458**

## DATE AND DAY CORRECTING DEVICE OF A TIMEPIECE

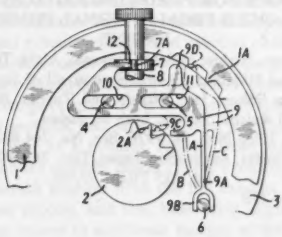
**Keiichi Suzuki; Keikichi Takahashi; Eiichi Matsuura, and Akinobu Harada, all of Tokyo, Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan**

**Filed Nov. 24, 1976, Ser. No. 744,926**

**Claims priority, application Japan, Nov. 27, 1975, 50-160640[U]**

**Int. Cl.² G04B *27/02***

**U.S. Cl. 58—63** **7 Claims**



1. In a timepiece: a base plate; a day-star wheel mounted for rotation on said base plate; an annular date ring mounted for rotation on said base plate concentrically of said day-star wheel to define an annular space between said day-star wheel and date ring, said date ring having inner teeth facing said day-star wheel; and a day/date correcting device for correcting setting of said day-star wheel and said date ring; wherein said correcting device is comprised of a correcting lever positioned within the space between said day-star wheel and said date ring, said correcting lever having a first protrusion opposite said day-star wheel for engaging said day-star wheel to advance the same when said correcting lever slides to a day correcting position, a second protrusion opposite said date ring for engaging said date ring to advance the same when said correcting lever slides to a date correcting position, and a tab extending therefrom, correcting lever mounting means for slidably mounting said correcting lever on said base plate for sliding between said day correcting position and said date correcting position and a neutral position intermediate said day and date correcting positions whereat neither said first protrusion and said second protrusion engage said day-star wheel and said date ring, respectively, a correcting wheel having a peripheral tooth and being mounted for rotation adjacent said tab of said correcting lever and position to engage said tab upon rotation of said correcting wheel to slide said correcting lever to said day correcting position and said date correcting position according to the direction of rotation of said correcting wheel for effectuating day and date correction, correcting wheel mounting means for mounting said correcting wheel for rotation adjacent said tab of said correcting lever, rotating means manually operable for rotating said correcting wheel to allow manual setting of day and date, and means for returning said correcting lever from said day and date correcting positions to said neutral position after said correcting wheel is rotated to disengage said tooth from said tab.

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**4,109,459**

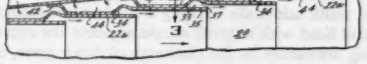
## DOUBLE WALLED IMPINGEMENT COOLED COMBUSTOR

**Edward E. Ekstedt; Edwin J. Beck, Jr.; Donald W. Bahr, all of Cincinnati, Ohio, and Barry Weinstein, Georgetown, Mass., assignors to General Electric Company, Cincinnati, Ohio**

**Continuation of Ser. No. 490,098, Jul. 19, 1974, abandoned, which is a continuation of Ser. No. 305,520, Nov. 10, 1972, abandoned. This application Feb. 21, 1975, Ser. No. 551,545**

**Int. Cl.² F02C *7/18***

**U.S. Cl. 60—39.66** **5 Claims**



1. A combustor for use in a gas turbine engine, comprising: a first wall defining a combustion zone, said first wall comprising a plurality of overlapping telescopically co-operating open ended hoops each having an upstream end and a downstream end with an integrally formed radially and circumferentially extending spacer portion rigidly connecting said ends and disposed therebetween, at least one of said hoops fixedly connected to and supported at its upstream and downstream ends against axial and radial movement by the next adjacent respective upstream and downstream hoop, said upstream end and said spacer portion of said one of said hoops overlapping the downstream end of said next adjacent upstream hoop such that a circumferentially extending gap is formed between said spacer portion and said downstream end of said next adjacent upstream hoop;

an outer casing partially defining a first cooling fluid plenum substantially circumscribing the first wall;

a second generally axially continuous wall spaced apart from the first wall and partially defining a second plenum;

a plurality of stiffening ribs disposed between the first and second walls and rigidly connecting said second wall to said hoops for dividing the second plenum into a plurality of circumferentially extending compartments substantially isolated axially from one another, each compartment bounding a preselected portion of the first wall;

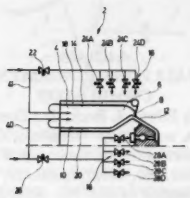
a plurality of apertures in said spacer portion for providing communication between preselected of said compartments and said combustion zone for exhausting fluid from said compartments into said combustion zone along and parallel to the first wall; and

a plurality of perforations of predetermined size in said second wall arranged according to a predetermined axial and radial spaced relationship for directing streams of cooling fluid into the compartments and directly against said first wall in individually controlled quantities.

## 4,109,460
## LIQUID FUEL ROCKET ENGINE HAVING ADJUSTABLE NOZZLE THROAT SECTION

Günther Schmidt, Unterhaching, Fed. Rep. of Germany, assignor to Messerschmitt-Bolkow-Blohm GmbH, Fed. Rep. of Germany

Filed Apr. 6, 1976, Ser. No. 674,089
Claims priority, application Fed. Rep. of Germany, Apr. 11, 1975, 2515845
Int. Cl.² F02K 9/02, 11/02, 1/10
U.S. Cl. 60—204 15 Claims



1. A liquid fuel rocket engine comprising an outer and inner concentrically arranged annular wall each having a plurality of separate segmental cooling jackets extending only over a portion of the circumference of said walls, a head closing one end of said walls, said walls defining a combustion chamber adjacent said head with a throat nozzle adjacent the opposite end opening outwardly for the discharge of thrust gases, the inner one of said walls having a diverging portion extending outwardly of said throat nozzle, means for circulating a propellant component through each of the segmental portions of said inner and outer walls, and control means for varying the amount of propellant component circulated into said segmental portions so as to regulate the expansion and contraction of said inner and outer walls and vary said throat portion cross section in accordance therewith.

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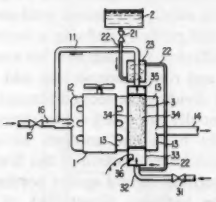
## 4,109,461
## METHOD FOR OPERATING INTERNAL COMBUSTION ENGINE

Yoshiyasu Fujitani, and Hideaki Muraki, both of Nagoya, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Japan

Filed Apr. 7, 1976, Ser. No. 674,630
Claims priority, application Japan, Apr. 7, 1975, 50-42534
Int. Cl.² F01N 3/08
U.S. Cl. 60—274 5 Claims



1. A method of operating an internal combustion engine comprising the steps of:

placing a reaction cylinder within a passage of exhaust gases being exhausted from an internal combustion engine in sealing relation therewith for the purpose of imparting heat produced in said reaction cylinder to said exhaust gases being exhausted from the engine, said reaction cylinder being filled with a rhodium catalyst for use in partially oxidizing hydrocarbons;

feeding into said reaction cylinder a mixture gas consisting of a hydrocarbon-base fuel and gas which contains oxygen of a quantity providing an oxygen-to-carbon ratio of 0.3 to 1.2;

partially oxidizing said fuel into a reformed gas for lean burn which contains 4.3 to 19.3% of hydrogen, 12.4 to 22.6% of carbon monoxide and 1.0 to 2.4% of methane in a temperature range of 800° C. to 1200° C. to produce reaction heat for maintaining said reaction cylinder in said temperature range;

mixing said reformed gas and a gas containing oxygen of a quantity providing an excess oxygen ratio of 1.1 to 2.0 to obtain a lean mixture gas for lean burn;

feeding said lean mixture gas into said internal combustion engine to operate the engine under such a lean mixture condition as to lower the quantity of nitrogen oxide produced in the exhaust gases;

exhausting exhaust gases to said passage of exhaust gases, which gases contain inflammable gases such as carbon monoxide and hydrocarbon produced due to said lean burn; and

heating said exhaust gases during their passing through said passage of exhaust gases to burn said inflammable gases residual in said exhaust gases by heat from the reaction cylinder which is placed within said passage of exhaust gases and which is maintained in said temperature range of 800° C. to 1200° C.;

whereby pure exhaust gases can be discharged into the atmosphere containing minimal amounts of harmful gases such as nitrogen oxide, carbon monoxide and hydrocarbons.

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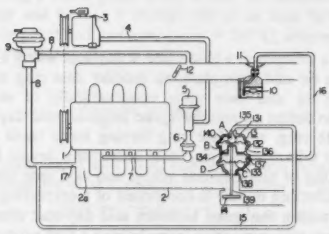
## 4,109,462
## DEVICE FOR PURIFYING EXHAUST GAS DISCHARGED FROM INTERNAL COMBUSTION ENGINE

Tokio Kohama, Nishio; Hideki Obayashi, Aichi; Tadashi Ozaki, Nishio, and Hidetaka Nohira, Susono, all of Japan, assignors to Nippon Soken, Inc., Nishio and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

Filed Nov. 24, 1976, Ser. No. 744,823
Claims priority, application Japan, Dec. 25, 1975, 50/157240
Int. Cl.² F02M 25/06
U.S. Cl. 60—278 13 Claims



1. In an exhaust gas purifying device for use with an internal combustion engine of the type comprising a secondary air supply system for supplying the secondary air into an exhaust system of the engine, and an exhaust gas recirculation system for recirculating a portion of exhaust gas in the exhaust system through an exhaust gas intake port and an exhaust gas recirculation passage into an intake system of the engine, an improvement comprising:

(a) variable restriction means disposed in said exhaust system downstream of said exhaust gas intake port for varying flow cross sectional area of said exhaust system, and

(b) control means for comparing a signal representative of the volume flow rate of recirculated exhaust gas with a

signal representative of the volume flow rate of intake air and controlling said variable restriction means in such a way that said signal representative of the volume flow rate of recirculated exhaust gas is made proportional to said signal representative of the volume flow rate of intake air.

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**4,109,463**

## EXHAUST REACTION CHAMBER FOR INTERNAL COMBUSTION ENGINE

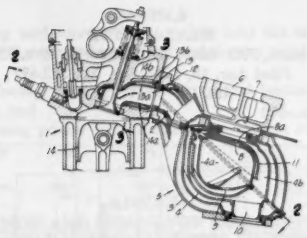
**Kiyoyuki Itakura, Asaka; Yohji Ishii, Saitama; Satoru Ohata, and Masao Watanabe, both of Asaka, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 5, 1976, Ser. No. 739,182**

**Claims priority, application Japan, Nov. 12, 1975, 50-153027[U]**

**Int. Cl.[2] F01N** *3/10;* **F02B** *19/10*

**U.S. Cl. 60—282** **3 Claims**



1. In an internal combustion engine, the combination of: an exhaust passage, an exhaust gas reaction chamber having an upstream inner chamber section connected to receive exhaust gases from said exhaust passage, said reaction chamber including a downstream outer chamber section surrounding said upstream inner chamber section, said inner chamber section having a discharge opening on its downstream side connecting said chamber sections, said inner chamber section also having a small leak hole in a position remote from said discharge opening, an intake mixture passage, heat exchange means for heating the intake mixture from the hot exhaust gases in the outer chamber section, said leak hole being aligned with the heat exchange means to accelerate heating of the intake mixture by means of exhaust gases ejected therethrough during engine warmup operation.

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**4,109,464**

## VAPOR GUARD SYSTEM

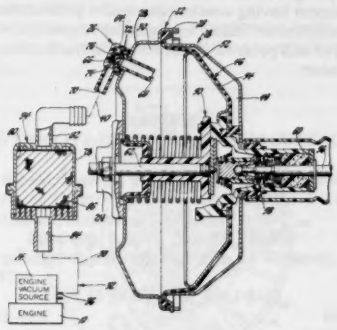
**Warren A. Wickland, Lake Orion, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Jun. 9, 1977, Ser. No. 805,010**

**Int. Cl.[2] F15B** *21/04*

**U.S. Cl. 60—397** **3 Claims**

3. In a power servomotor system having a servomotor operated by differential air pressures with one pressure being atmospheric air and the other pressure being air at other than atmospheric air and generated by a pressure source which also entrains vapors therein which are capable of adversely affecting said servomotor if the vapors enter said servomotor and particularly if the vapors are condensed therein, said servomotor being connected to said pressure source by a fluid conduit, the improvement comprising a vapor trap in said conduit which traps and holds said entrained vapors in other pressure otherpressure air which would otherwise be transmitted to said servomotor from said pressure source during air flow from said pressure source to said servomotor through said fluid conduit, said vapor trap being purged of vapors so trapped therein upon




air flow through said fluid conduit from said servomotor to said pressure source.

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**4,109,465**

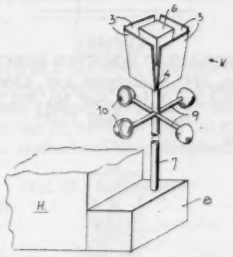
## WIND ENERGY ACCUMULATOR

**Abraham Plen, 12 Ussishkin St., Tel Aviv, Israel**

**Filed Jun. 13, 1977, Ser. No. 806,264**

**Int. Cl.[2] F15B** *1/02, 13/09*

**U.S. Cl. 60—398** **6 Claims**



1. An accumulator storing wind energy comprising at least one air pumping device, at least one hinged flap adapted to be turned into the wind, the said air pumping device being actuated by the said flap whenever the latter faces the direction from which wind blows and a container into which the air is pumped, the said air pumping device being connected by a conduit with said container, the whole assembly of above elements being rotatively held, means being provided to cause the assembly constituting the accumulator device to turn with the wind blowing.

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**4,109,466**

## HYDRAULIC TRANSMISSION

**Roger A. Keech, San Luis Obispo, CA, assignor to Dana E. Keech, San Bernardino and Ronald S. Mullisen, Los Osos, both of, Calif., part interest to each**

**Filed May 27, 1977, Ser. No. 801,203**

**Int. Cl.[2] F16D** *39/00*

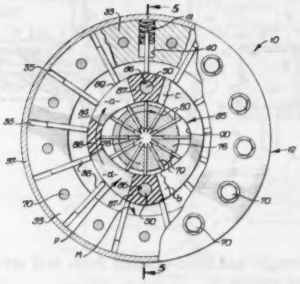
**U.S. Cl. 60—487** **8 Claims**

1. In a co-axial co-planar combined central hydraulic radial vane pump and peripheral hydraulic radial vane motor functioning in a common cylindrical chamber to form a hydraulic positive displacement power transmission, the combination of:

a flexible, unitary annular common element interposed within said chamber to surround and be engaged by the vanes of said pump and be surrounded and engaged by the vanes of said motor;

said element having continuous internal and external annular surfaces continually engaging the vanes respectively of said pump and said motor;

said element having continuous parallel polar surfaces making continuous sealing engagement respectively between each of said polar surfaces and one of the end faces of said chamber,



co-axial drive and driven shafts connected respectively to said pump and said common element; and

means operable through said driven shaft to flex the material of said common element to coordinately modify said continuous annular internal and external surfaces thereof and thereby convert said transmission from one drive ratio to another.

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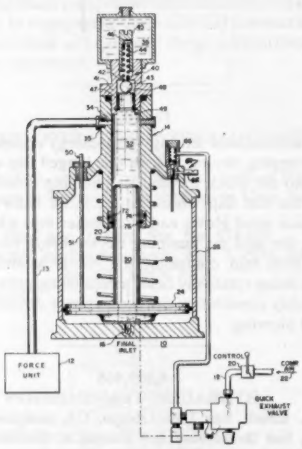
**4,109,467**

## HYDRAULIC BOOSTER SYSTEM

George N. Lukas, 2242 W. Belmont Ave., Chicago, Ill. 60618

Filed Jul. 7, 1976, Ser. No. 703,282
Int. Cl.[2] B60T *17/22*
U.S. Cl. 60—534 5 Claims




1. A hydraulic booster for selectively driving a power unit via a hydraulic circuit, said booster including an air cylinder, an air driven piston reciprocable in said air cylinder, air supply means for selectively energizing said air cylinder to cause reciprocation of said air driven piston, a hydraulic cylinder coaxially disposed and rigidly connected with said air cylinder, a hydraulic piston rigidly connected to said air driven piston, said hydraulic piston having a smaller cross-sectional area than said air driven piston, a body of hydraulic fluid in said hydraulic cylinder, a conduit for transferring hydraulic fluid between said hydraulic cylinder and said power unit, a hydraulic reservoir mounted in said hydraulic cylinder for replenishing the hydraulic fluid therein, a valve unit mounted in said hydraulic cylinder, externally of said hydraulic piston, said valve unit comprising a valve seat in said hydraulic cylinder, a ball movable between a normally open position away from said valve seat permitting hydraulic fluid flow between the reservoir and the hydraulic cylinder to replace any hydraulic losses in the hydraulic cylinder and to return any excess of hydraulic fluid in the hydraulic cylinder to the reservoir and to also permit any air present in the fluid in the hydraulic cylinder to migrate from the hydraulic cylinder to the reservoir, and a closed position on said valve seat preventing fluid communication in either direction between the hydraulic cylinder and the reservoir, a spring bearing on said ball to maintain it in the normally open position when the air cylinder is not energized, means for adjusting the bias of the spring, a piston positioned below the ball to automatically and directly move the ball to its closed position in response to hydraulic fluid pressure surges in the hydraulic cylinder when the air cylinder is energized.

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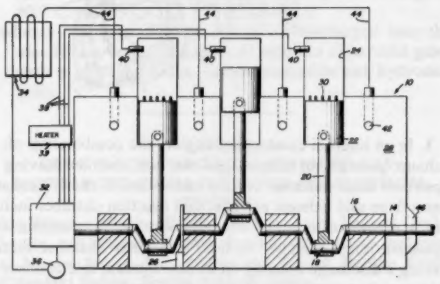
**4,109,468**

## HEAT ENGINE

Willie L. Heath, P.O. Box 122, Dardanelle, Ark. 72834

Filed Apr. 18, 1973, Ser. No. 352,477
Int. Cl.[2] F01K *25/10*
U.S. Cl. 60—670 1 Claim




1. A device for converting heat energy into mechanical energy comprising a closed system utilizing a condensible-vaporizable working fluid, said system including a piston and cylinder assembly mounted for relative movement to define an expansible working chamber, means injecting working fluid in the liquid state into the working chamber, exhaust valve means in the working chamber to discharge expanded gaseous working fluid, condensing means receiving gaseous working fluid from the exhaust valve means and changing it to liquid, and pump means supplying liquid working fluid to the injecting means under high pressure, means applying external heat to the working fluid prior to entry into the working chamber, said exhaust valve means being timed whereby at least a portion of the compression movement of the piston will compress gases in the cylinder whereby the heat of compression will heat the gases to heat and expand the injected working fluid into gaseous working fluid to move the piston during its working movement.

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**4,109,469**

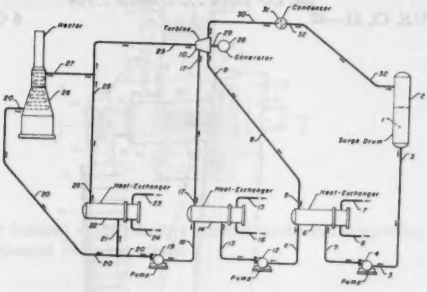
## POWER GENERATION FROM REFINERY WASTE HEAT STREAMS

Don B. Carson, Mt. Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Feb. 18, 1977, Ser. No. 770,178
Int. Cl.[2] F01K *13/00, 25/08*
U.S. Cl. 60—676 9 Claims

1. A process for the generation of power which comprises the steps of:

(a) contacting a coolant at elevated pressure with at least one refinery process stream having a temperature sufficient to vaporize a portion of said coolant and separating resultant coolant vapors from unvaporized coolant;
(b) expanding the coolant vapors through a turbine to a lower pressure;




(c) passing said unvaporized coolant into the convection section of a direct-fired heater and therein vaporizing the same;
(d) introducing resultant vapors from said heater into said turbine; and
(e) generating power from the resulting motion of said turbine.

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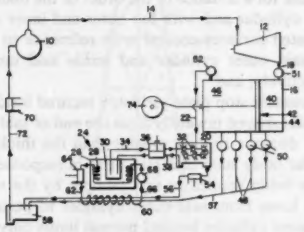
**4,109,470**

## METHOD AND MEANS FOR RECLAIMING MECHANICAL ENERGY AND HOT CONDENSATE FROM EXHAUST STEAM

**James Lawrence Cassidy, 66 Prospect St., Turners Falls, Mass. 01376**

**Filed May 5, 1976, Ser. No. 683,639**
**Int. Cl.² F01K *9/00***
**U.S. Cl. 60—685** **1 Claim**



1. A process for salvaging and recycling all the latent heat energy of exhaust steam comprising:
(a) generating steam in a steam generator;
(b) leading said steam to a turbine for expansion for obtaining useful work;
(c) leading the final exhaust steam through an expansible chamber device;
(d) wherein a vacuum is maintained on the non-working side of said expansible chamber device;
(e) such that the exhaust steam is forced to do work by virtue of its higher residual vapor pressure which brings about condensation of a major portion of the exhaust steam at a temperature near its boiling point during the working stroke of the expansible chamber device;
(f) leading said resulting hot condensate from the major portion to a feedwater tank;
(g) removing the minor portion of the exhaust steam which has not condensed, to a condenser cooled by a controlled spray of refrigerated condensate chilled by a refrigerator;
(h) leading the resulting cold condensate through a heat exchanger attached to the hot coil of the refrigerator prior to delivering it to the feedwater tank;
(i) recycling the contents of the feedwater tank back to the steam generator;
(j) repeating the steps of *a* –*i* in a continuous cycle; and
(k) recycling the mechanical work done as expedience may require.

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**4,109,471**

## METHOD OF COVERING THE BOTTOM SURFACE IN A GAS CAVERN

**Franz X. Sebald, Munich, and Hans-Dieter Hagemann, Hamburg, both of Germany, assignors to Deutsche Texaco Aktiengesellschaft, Hamburg, Germany**

**Filed Sep. 2, 1976, Ser. No. 719,890**
**Claims priority, application Fed. Rep. of Germany, Sep. 6, 1975, 2539720**
**Int. Cl.² B65G *5/00*; B01J *1/18***
**U.S. Cl. 61—0.5** **10 Claims**

1. In the storage of gaseous hydrocarbons in an underground cavern containing a water sump layer in the bottom thereof having a surface in contact with the gaseous hydrocarbons, the improvement comprising:
covering the surface of said water sump layer with a separation layer by the deposition thereon of a vapor barrier consisting essentially of a carpet of bitumen to prevent the vaporizing of said water into said gaseous hydrocarbons by the injection into said cavern of a mixture of bitumen and a volatile liquid hydrocarbon carrier wherein said carpet of bitumen is formed by the vaporization of said volatile liquid hydrocarbon in said cavern.

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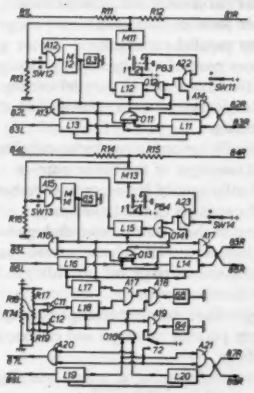
**4,109,472**

## LONGWALL MINING APPARATUS

**Robert Graham Harris, Longlevens, England, assignor to Dowty Mining Equipment Limited, Tewkesbury, United Kingdom**

**Filed Jan. 21, 1977, Ser. No. 761,539**
**Claims priority, application United Kingdom, Jan. 24, 1976, 2787/76**
**Int. Cl.² E21D *15/44***
**U.S. Cl. 61—45 D** **11 Claims**



1. Mining apparatus for use on a mineral face comprising a plurality of roof supports arranged in a line along the face, advancing means for each support, an advance prime signal generating means on each support adapted to generate an advance prime signal on completion of a support advance movement, an advance prime signal transmission means between each adjacent pair of supports adapted to feed an advance prime signal only to a support adjacent to the advance prime signal generator giving the prime signal, a plurality of

manually operable controls one on each of some or all of the supports, each of which on actuation is adapted to generate an advance enable signal, advance enable signal transmission means extending between all supports connected to receive and to transmit any advance enable signal, and limiting means associated with the enable signal transmission means adapted to ensure that any advance enable signal may not be carried by said enable signal transmission means for more than a predetermined number of supports from the position of generation of an advance enable signal, each said advancing means being adapted to cause advance of the associated support only on receipt of an advance prime signal and an advance enable signal, said predetermined number of supports being less than the number of supports along the face, and the number of supports between any two successive supports having manually operable controls being not more than said predetermined number.

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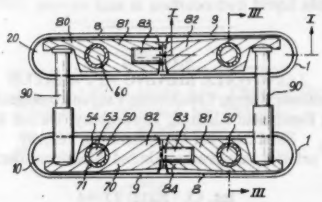
**4,109,473**

## ROOF SUPPORTS

**Alfred A. Valantin, Clermont, France, assignor to Charbonnages de France, Paris, France**

**Filed Jun. 21, 1977, Ser. No. 808,548**
**Claims priority, application France, Jun. 29, 1976, 76 19718**
**Int. Cl.[2] E21D *15/44***
**U.S. Cl. 61—45 D** **12 Claims**




1. A roof support capable of being moved by a drive mechanism while under permanent load, comprising:

a pair of upper parallel carriages;

a pair of lower parallel carriages;

the pair of upper parallel carriages being disposed above and parallel to the lower pair of parallel carriages;

four endless, articulated tracks, one guided about each respective carriage;

two longitudinally spaced upper cross-members connecting the parallel carriages of the upper pair;

two longitudinally spaced lower cross-members connecting the parallel carriages of the lower pair;

said connecting of these four cross-members being provided by pivotal joint means interpased between each respective cross-member and carriage and providing at least two axes of rotation therebetween;

an upper longitudinal member arranged laterally intermediate the upper parallel carriages and connecting the upper cross-members;

a lower longitudinal member arranged laterally intermediate the lower parallel carriages and connecting the lower cross-members;

said connecting of the longitudinal members with the respective cross-members being provided by pivotal joint means providing at least one axis of rotation therebetween;

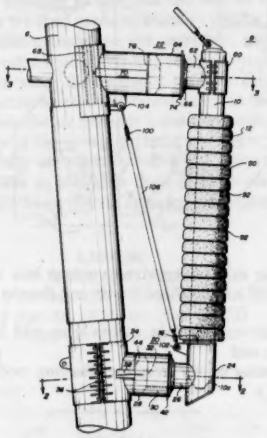
means for applying a force upon said cross-members by way of said longitudinal members to separate the upper carriages from the lower carriages for respectively applying the upper carriages against a gallery roof and the lower carriages against a gallery floor.

**4,109,474**

## BUMPER ASSEMBLY SHOCK CELL SYSTEM

**James H. Files, New Orleans, La.; John M. Montague, Dallas, and Clarence T. Thomerson, Corsicana, both of Tex., assignors to Regal Tool & Rubber Co., Inc., Corsicana, Tex.**

**Filed Oct. 15, 1976, Ser. No. 732,653**
**Int. Cl.[2] E02B *3/22*; B63B *21/04***
**U.S. Cl. 61—48** **6 Claims**



1. A shock cell for a bumper for fending off vehicles traveling adjacent a fixed sturcture which comprises:

(a) an outer cylinder extending from said structure horizontally;

(b) an inner cylinder coupled to said bumper and extending into the open end of said outer cylinder;

(c) an annular rubber cylinder bonded to the inner surface of said outer cylinder and to the outer surface of said inner cylinder for a distance of the order of the diameter of said inner cylinder and with the outer and inner ends having truncated surfaces conical with reference to apexes outside said outer cylinder and inside said inner cylinder respectively; and

(d) a shearable stop plate yieldably secured inside said outer cylinder spaced inwardly from the end of said inner cylinder a distance slightly greater than the thickness of said annular body such that said plate in response to extreme forces being applied to said bumper by the vehicles will shear loose from said outer cylinder to permit travel of said inner cylinder beyond normal limits only in response to said extreme forces.

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**4,109,475**

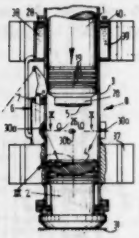
## PILE-DRIVING RAM AND METHOD OF CONTROLLING THE SAME

**Hans Gunther Schnell, Hamburg, Fed. Rep. of Germany, assignor to Van Kooten B.V., Naarden, Netherlands**

**Filed Dec. 5, 1975, Ser. No. 638,268**
**Claims priority, application Netherlands, Dec. 10, 1974, 7416078; Dec. 10, 1974, 7416080**
**Int. Cl.[2] E02D *7/02***
**U.S. Cl. 61—53.5** **32 Claims**

1. A method of regulating the supply of fuel per stroke cycle to a pile-driving Diesel rammer, comprising the steps of measuring a parameter of the pile during each stroke of the rammer; adjusting the fuel supply per stroke according to the value of said parameter, measured during at least two preceding strokes of the rammer and more in accordance with the fuel

supply adjusted during the stroke which gave the better result; said measuring step comprising measuring the value of the



energy induced in the pile by a rammer stroke and integrating the measured value over time.

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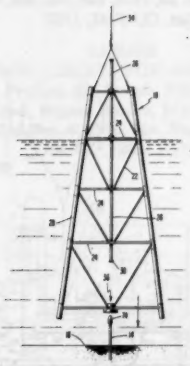
4,109,476

## DOCKING AN OFFSHORE STRUCTURE WITH A SUBMERGED FIXTURE

Bert E. Gracia, Houston, Tex., assignor to Brown & Root, Inc., Houston, Tex.

Filed May 20, 1977, Ser. No. 798,880
Int. Cl.² E02B *17/00*
U.S. Cl. 61—87 17 Claims



1. A method of docking an offshore structure with a submerged fixture, said structure having first leg means for engaging the seabed and second means spaced from the leg means for engaging said submerged fixture, comprising the steps of:

positioning said structure in the water above said fixture;

lowering said structure downwardly around said fixture so that said second means engages said fixture and has limited movement in a lateral direction,

interposing alignment means in contacting relation between said second means and said fixture to locate said second means in a predetermined lateral position relative to said fixture; and

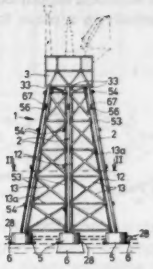
with said alignment means maintained in said interposed position for maintaining alignment between said second means and said fixture, lowering said structure relative to said fixture until said first means becomes embedded in the seabed.

4,109,477

## OFFSHORE DRILLER RIG

Rudolf Vogel, Salzgitter-Bad, Germany, assignor to Salzgitter Maschinen AG, Salzgitter, Germany

Continuation of Ser. No. 550,725, Feb. 18, 1975, abandoned. This application Dec. 11, 1975, Ser. No. 639,836
Claims priority, application Fed. Rep. of Germany, Feb. 18, 1974, 2407655
Int. Cl.² E02D *17/00, 27/42*
U.S. Cl. 61—87 108 Claims



1. An off-shore drilling rig, comprising at least one upright framework structure provided with an upper platform and with a plurality of downwardly extending hollow legs, each leg having a lower end and an upper end through which its interior is accessible from said platform; a plurality of ballastable floats together furnishing at least part of the buoyancy required to maintain the framework structure afloat preliminary to anchoring on the ocean bottom, each of said floats being mounted at one of said lower ends and having a bottom wall and a deformable skirt surrounding said bottom wall and depending downwardly beyond the same; dispensing means provided at the respective floats and having a plurality of apertures located below the bottom wall of the respective float for dispensing of flowable material; means for communicating the interior of each float with the interior of the associated leg and with the region beneath the bottom wall of said float, said communicating means comprising an upper port means for communicating the interior of the respective float with the associated leg, and lower port means in the bottom wall of the respective float, and wherein each leg has a portion extending into the respective float, and said upper port means comprises three equi-angularly spaced openings in said portion; an openended tubular member received in said portion with clearance; a plurality of elastic sealing elements in said clearance intermediate the respective openings, at least one of said sealing elements being inflatable to thereby exert pressure upon said portion and tubular member and also urge the latter into sealing engagement with the other sealing elements; and remote-controllable means connected with said tubular member for effecting axial movement of the same within said portion.

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4,109,478

## UNITIZED CONDUCTOR GUIDE AND FRAME FOR OFFSHORE DRILLING AND PRODUCTION

Bert E. Gracia, Houston, Tex., assignor to Brown & Root, Inc., Houston, Tex.

Filed Jan. 5, 1978, Ser. No. 867,116
Int. Cl.² E02D *17/00*
U.S. Cl. 61—86 5 Claims

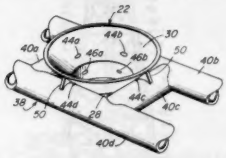
1. Apparatus for guiding a drill conductor from a deck portion of an offshore platform, situated in a body of water, into the bottom of said body of water, comprising

at least one guide member, each said guide member comprising

an upwardly directed, outwardly flanged, funnel-shaped portion having a conductor receiving upper opening and a smaller, conductor guiding exit aperture, and

a downwardly directed hollow cylindrical member integrally connected to the funnel-shaped portion at the conductor exit aperture to form a substantially continuous interior guide surface for said conductor,

at least one guide member support structure, each said guide member support structure comprising a plurality of connected structural members supported by said platform and arranged substantially in a plane for defining a support opening



for passing said cylindrical member of an associated guide member, and

for supporting said funnel-shaped portion of said associated guide member, said funnel-shaped portion being in contiguous contact with said structural members at at least a plurality of contact positions, and

for each guide member-guide member support pair,

said funnel-shaped portion contacts said structural members at at least three positions,

said cylindrical member is snugly nestled against and positioned within said guide member support opening, and

said guide member and said guide member support are secured to each other at a plurality of said contacting positions.

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**4,109,479**

## METHOD AND APPARATUS FOR TENSIONING ANCHOR LINES

**Alain Godeau, Pau, and Jean-Yves Heas, Bizanos, both of France, assignors to Societe Nationale Elf Aquitaine (Production), Paris, France**

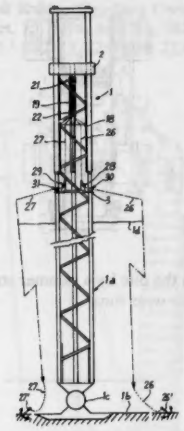
**Filed Oct. 17, 1977, Ser. No. 842,797**

**Claims priority, application France, Oct. 19, 1976, 76 31394**

**Int. Cl.[2] E02B *17/00*; B63B *35/44, 21/50***

**U.S. Cl. 61—94** **10 Claims**

1. Apparatus for tensioning anchor lines connecting a marine structure to the ocean floor characterized in that there is a movable assembly, connecting means for releasably connecting at least one pair of anchor lines to said movable assembly, means mounting said movable assembly for movement vertically on said structure to an upper position and a lower position, a floor fixed to said structure below the lower position of said assembly, a plurality of anchor line stopper devices fixed on said floor in generally opposed relation to each other, a plurality of pulleys between the chain stoppers and the assembly, said movable assembly being suspended from the structure by a pulley system including a fixed block connected to the structure above the upper position of the movable assembly and a movable block connected to the movable assembly, and a cable connecting the pulleys and having one end fixed with respect to one of the blocks, and its other end connected to means for exerting a pulling force, said tensioning apparatus being adapted to tension opposed anchor lines extending from anchors on the ocean floor through the chain stoppers, and



then through the pulleys to the connecting means on the movable assembly.

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**4,109,480**

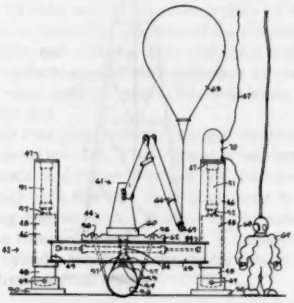
## UNDER WATER CRANE

**Maurice N. Sumner, Houston, Tex., assignor to The Sea Horse Corporation, Houston, Tex.**

**Filed Jun. 20, 1975, Ser. No. 588,761**

**Int. Cl.[2] F16L *1/00***

**U.S. Cl. 61—114** **9 Claims**



1. A crane for use under water comprising:

a frame having a column and a beam connected to said column,

a powered thrusting means for raising and lowering said beam, mounted in said column,

a footing for contacting the marine floor, and articulately attached to a leg, said leg being attached to powered thrusting means, thereby allowing unequal raising and lowering of the beam,

a sled slidably mounted on said beam, said sled having a powered rotary mounted telescoping boom thereon allowing handling of a first load in three degrees of freedom and above said sled while said sled lifts a second load,

a powered thrusting means for lateral movement mounted to said beam,

means coupling said sled to said lateral thrusting means, and

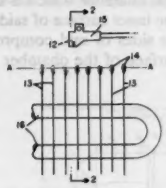
means for suspending objects from said sled.

4,109,481

## FROST DETECTOR

S. Christopher Peek, Hull, Mass., assignor to GTE Sylvania Incorporated, Danvers, Mass.

Filed Dec. 16, 1976, Ser. No. 751,236
Int. Cl.[2] F25D *21/02*
U.S. Cl. 62—140 1 Claim



1. A frost detector for use in refrigeration apparatus having refrigerant-containing coils equipped with cooling fins comprising an emitter mounted in a support for emitting a narrow beam of pulsed infrared radiation, a detector of narrow field of view mounted in said support for detecting reflected infrared radiation, the emitter and detector being angled toward each other so that the beam of the emitter and the field of view of the detector intersect at a predetermined distance from said support, which distance is about equal to the distance between said support and the plane containing the proximate edges of the cooling fins and wherein the beam emitted by said emitter is between but substantially parallel to a pair of cooling fins.

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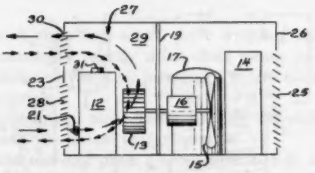
4,109,482

## FAN CONTROL CIRCUIT FOR AIR CONDITIONER

Samuel Joseph Pearson, St. Joseph, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Dec. 6, 1976, Ser. No. 747,668
Int. Cl.[2] F25D *17/06*
U.S. Cl. 62—180 11 Claims



1. In an air conditioning apparatus including an evaporator, a compressor, air circulating means for circulating room air in heat transfer association with said evaporator, and first temperature responsive means for controlling the operation of said compressor, improved control means for said air circulating means comprising:

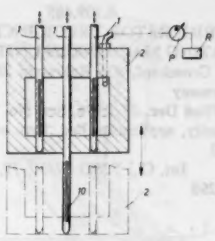
second temperature responsive means operative at temperatures above a predetermined temperature below the temperature at which said first temperature responsive means operates to energize said compressor to energize said air circulating means independent of the operation of said first temperature responsive means and further operative at a temperature below said predetermined temperature to energize said air circulating means only during energization of said compressor by said first temperature responsive means.

4,109,483

## APPARATUS FOR PRINTING WEBS

Mathias Mitter, Falkenstr. 57, 4815 Schloss Holte, Fed. Rep. of Germany

Filed Oct. 26, 1976, Ser. No. 735,198
Claims priority, application Fed. Rep. of Germany, Feb. 27, 1976, 2608005
Int. Cl.[2] D06B *1/08*
U.S. Cl. 68—200 53 Claims



1. An apparatus for printing onto webs, particularly textile webs, comprising support means for supporting a web to be printed in a working plane; mounting means adjacent said support means; a plurality of plunger elements carried by said mounting means in a grid-shaped pattern and each having a free end portion operative for applying a dot of printing medium to a web; moving means for displacing said plunger elements with reference to said web in respective reciprocating cycles during each of which the plunger elements successively assume a retracted position and an advanced printing position in the latter of which the respective free end portion physically contacts said web and applies a dot of printing medium to the same; means for supplying printing medium to be entrained by said plunger elements during the reciprocation thereof; means operable during the respective reciprocating cycles in accordance with a pattern to be printed, for selecting different groupings of individual plunger elements to be displaced to said advanced position by operation of said moving means; and transporting means for effecting movement of at least one of said support means and mounting means relative to the other one thereof parallel to said working plane.

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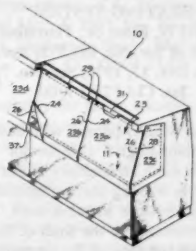
4,109,484

## THERMAL PROTECTIVE BARRIER FOR OPEN REFRIGERATED COMPARTMENT

William E. Cunningham, San Carlos, Calif., assignor to Sullivan Company, San Francisco, Calif.

Filed Mar. 3, 1977, Ser. No. 773,930
Int. Cl.[2] A47F *3/04;* A47H *23/00, 3/00, 15/00*
U.S. Cl. 62—256 5 Claims



1. A thermal barrier for inhibiting the transfer of energy between the environs and an open refrigerated compartment during limited periods of inactivity comprising pliant panel means sufficiently extensive to cover the opening of said com-

partment, readily releasable fastening means disposed along an edge margin of said compartment, fastening means carried by an edge margin of said panel means for cooperation and engagement with the first named fastening means to retain said panel means disposed to extend across and close said compartment, said panel means comprising a layer of substantially impervious pliant material and a layer of thermal insulating material carried on the inner face of said impervious material.

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**4,109,485**

## REFRIGERATOR TRUCK INCLUDING A REFRIGERATING MACHINE IN UNIT CONSTRUCTION

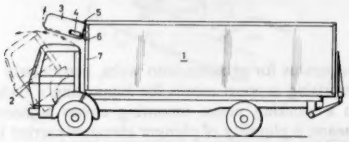
**Peter Volker Grosskopf, Am Ruhrstein 25a, 4300 Essen, Fed. Rep. of Germany**

**Filed Dec. 27, 1976, Ser. No. 754,227**

**Claims priority, application Fed. Rep. of Germany, Dec. 27, 1975, 2558822**

**Int. Cl.² F25D** *19/00, 19/02*

**U.S. Cl. 62—298** **3 Claims**



1. A refrigerator truck comprising an insulated truck body,
a driver's cabin mounted forwardly of said truck body and adjacent thereto, said cabin being pivotally mounted for swinging about its forward lower end thereby raising the rearward upward end of said cabin,
a refrigerating machine positioned directly above said driver's cabin, said cabin being immediately and directly below said refrigerating machine,
means mounting said refrigerating machine to said truck for pivoting said refrigerating machine about an upper rear edge of said refrigerating machine,
said pivotally mounted refrigerating machine including a condenser means, an evaporator means and a motor means and being pivotable therewith,
said truck body having an opening therein for receiving cooled air from said evaporator means, said evaporator means being positioned outside of said truck body and in a position to be free to pivot upwardly relative to said truck body,
said refrigerating machine having a discharge into an air inlet leading into said truck body and means for pivoting said refrigerator machine upwardly sufficiently to allow said driver's cabin to pivot forwardly.

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**4,109,486**

## HEATING SYSTEM

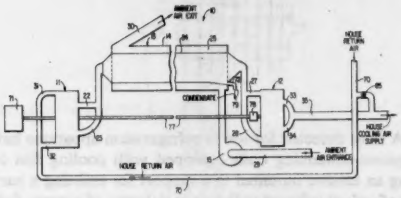
**Charles A. Sieck, 2311 N. Front St., Harrisburg, Pa. 17110**

**Continuation-in-part of Ser. No. 681,575, Apr. 29, 1976. This application Dec. 17, 1976, Ser. No. 751,599**

**Int. Cl.² F25D** *9/00*

**U.S. Cl. 62—402** **4 Claims**

1. A heating system which operates with heat extracted from the ambient air, comprising: a compressor having a rotor which rotates about a shaft; an auxiliary motor attached to said compressor to assist in driving said compressor; an expander having a rotor which rotates about a shaft, the shaft of the compressor being connected to the shaft of the expander by a common shaft to allow the shaft of the compressor to be driven by the expander; a heat exchange liner apparatus in fluid communication between said compressor and expander, said heat exchange liner apparatus including an outer case and an inner concentrically mounted liner which together provide an annular chamber therebetween, said annular chamber being in heat exchange relation with said liner; an inlet air conduit including means for providing ambient air to the inlet side of said compressor; and means for passing air through said annular chamber in heat exchange relationship with said heat exchange liner apparatus, wherein said compressor comprises a generally cylindrical rotor, said compressor rotor being provided with a plurality of generally radially extending, slidable vanes; a rotor housing surrounding said compressor rotor and having a generally cylindrically shaped chamber which is concentric with said compressor rotor, the inner surface of said chamber slanting inwardly on opposite sides of said compressor rotor to a point where the inner surface of the chamber is closely adja-



cent to said compressor rotor on opposite sides of said compressor rotor to provide a pair of compression cavities, each of which is crescent-shaped at one end thereof, on opposite sides of said compressor rotor, the inner surface of said chamber being engaged by said vanes, said vanes being biased outwardly against the inner surface of said chamber; a suction port and a discharge port for each of said compression cavities, each discharge port being located in the crescent-shaped end of its respective cavity and with each suction port being located at the opposite end of its respective cavity, each discharge port having valve means for allowing discharge of gas from said respective cavity at a predetermined pressure.

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**4,109,487**

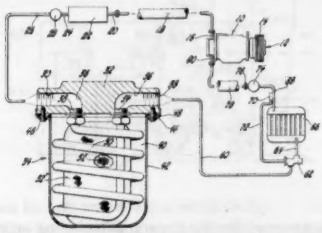
## MOISTURE EXTRACTOR

**Herbert Carr, Newfane, N.Y., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Jan. 18, 1977, Ser. No. 760,338**

**Int. Cl.² F25B** *43/00*

**U.S. Cl. 62—474** **6 Claims**



1. In a refrigerant system having a closed fluid circuit, including flexible hose means with hose walls somewhat permeable to the movement of water therethrough in response to differential humidity between the atmosphere and the refrigerant circuit, an externally accessible dehumidifying apparatus comprising:
enclosure-forming means of water-impermeable material defining an interior space, including a detachable closure member providing access to said interior space;
inlet and outlet forming means to and from said interior space adapted to be fluidly connected in said fluid circuit for flow through said interior space; means including a member of material permeable to the passage of water therethrough separating the interior space of said enclo-

sure into a fluid-carrying portion and a dry atmosphere portion, with said detachable closure member exposed to said atmosphere portion and said inlet and outlet forming means exposed to said fluid-carrying portion;

a quantity of desiccant material within said dry atmosphere portion for holding moisture which passes through said permeable member from said fluid-carrying portion in response to the differential humidity therebetween.

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**4,109,488**

## SHOCK ABSORBING ROTARY DRIVE COUPLING

**John Thompson Work, Anaheim, Calif., assignor to BJ-Hughes Inc., Long Beach, Calif.**

**Filed Nov. 22, 1976, Ser. No. 743,565**
**Int. Cl.[2] F16D *3/54*; F16F *15/10***
**U.S. Cl. 64—11 R** **12 Claims**

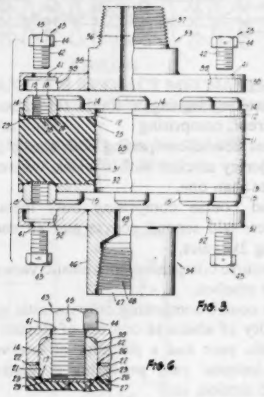


FIG. 3.



FIG. 6

1. A shock absorbing, rotary drive coupling unit for drivingly connecting a tubular drive shaft means to an axially aligned tubular driven shaft means of a rotary blast hole drill which comprises:

an annular driven plate having an axis alignable with the common axis of said shaft means;

an annular driving plate disposed parallel to and axially spaced from said driven plate;

an annular body of resilient, elastomeric material sandwiched between said plates, one end of said body being bonded to one face of said driven plate and the other end of said body being bonded to the opposed face of said driving plate, said annular plates and said annular body providing an axial passage for the flow of pressurized drilling gas therethrough;

each of said plates having a plurality of circularly arranged lug means projecting generally axially therefrom for respective engagement with complementary driving recess means on said tubular drive shaft means and with complementary driven recess means on said tubular driven shaft means; and

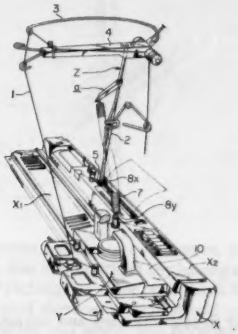
complementary fastener elements cooperative between said plates and the respective drive shaft means and driven shaft means for maintaining said lug means and said lug receiving recess means in said seated engagement.

**4,109,489**

## ELECTRICAL CONNECTING DEVICE FOR A HAND-OPERATED KNITTING MACHINE

**Yasuhiro Iwasaki, Kodaira, Japan, assignor to Silver Seiko Ltd., Kodaira, Japan**

**Filed Mar. 4, 1977, Ser. No. 774,531**
**Claims priority, application Japan, Sep. 3, 1976, 51-27123**
**Int. Cl.[2] D04B *15/66***
**U.S. Cl. 66—75.2** **12 Claims**



1. In a hand-operated knitting machine having a machine body, a needle bed on said machine body, a carriage mounted for sliding movement on the needle bed, first circuit means on the machine body, and second circuit means on the carriage, the improved apparatus for establishing electrical connection between said first and second circuit means, comprising:

a first jack means fixed on the machine body and electrically connected to the first circuit means;

a second jack means fixed on the carriage and electrically connected to the second circuit means;

a flexible electrical connecting cable adapted to provide electrical connection between the first and second circuit means, said connecting cable having a first and a second plug means for mating connection with said first and second jack means respectively;

supporting means on the machine body for supporting a portion of said connecting cable above said needle bed and the carriage; and

means for taking up slack in said cable between said portion of said cable and said second plug means so that said connecting cable is prevented from interfering with operation of the knitting machine.

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**4,109,490**

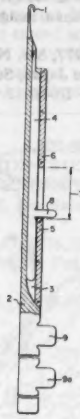
## SLIDING LATCH NEEDLE

**Juan Bosch, Mataro, Spain, assignor to Tecnologia Industrial, Proyectos Y Promociones, S.A., Mataro, Spain**

**Filed Mar. 4, 1977, Ser. No. 774,605**
**Claims priority, application Spain, Mar. 5, 1976, 445,984**
**Int. Cl.[2] D04B *35/06***
**U.S. Cl. 66—120** **10 Claims**

1. A needle assembly for use in a knitting machine comprising a shank having one end with a hook thereat, said shank having a longitudinal groove therein, a plate slidably mounted in said groove to form a single unit with said shank, said plate being slidably mounted for movement between an extended position in which the plate cooperates with said hook to close the same and a retracted position in which the hook is open, means on said shank for cooperating with external cams for displacing the shank longitudinally between raised and lowered positions, and stop means forming part of said unit and disposed cooperatively between said plate and said shank for establishing said retracted and extended positions of said plate while retaining said plate in said groove to preserve the integrity of said unit, said stop means comprising stop members

bounding said groove in longitudinally spaced relation, and a lug on said plate positioned to contact said stop members



respectively in said extended and retracted positions and to slide freely therebetween.

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**4,109,491**

## THREAD GUIDANCE IN MESH-FORMING MACHINES WITH ROTATING THREAD GUIDES

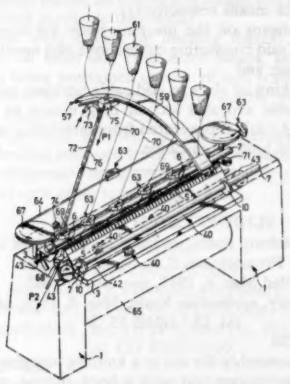
**Manfred Schmid, Mörikestr. 8, 7445 Bempflingen; Werner Sommer, Kolpingstr. 51, 7300 Esslingen, and Antonius Vinnemann, am bopserweg, 11 7000 Stuttgart 1, all of Fed. Rep. of Germany**

**Continuation of Ser. No. 705,285, Jul. 14, 1976, abandoned. This application Mar. 11, 1977, Ser. No. 776,910**

**Claims priority, application Fed. Rep. of Germany, Jul. 14, 1975, 2531734**

**Int. Cl.[2] D04B *3/06***

**U.S. Cl. 66—125 R** **24 Claims**



1. A method of automatically feeding to a loop forming machine a plurality of threads by a plurality of first thread guides and a plurality of second thread guides, said method comprising the steps of moving said second thread guides one after the other in one direction along an endless path each second guide having a first position corresponding to the beginning of and a second position corresponding to the end of a fabric produced by said machine; feeding said threads via said second guides to said machine only during movement of said second guides from said first position to said second position; cutting said threads for obtaining thread ends when said second guides arrive at said second position; drawing said thread ends out of said second guides at said second position; returning said thread ends back to said first position so that twisting of said plurality of said threads will not occur; returning said second guides back to said first position along said endless path; and inserting each of said returned thread ends into an associated one of said second returned thread guides at said first position for again feeding the thread associated with said thread end to said machine.

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**4,109,492**

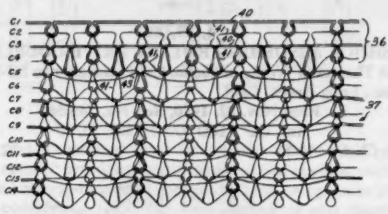
## NO ROLL STOCKING AND METHOD

**Fred B. Roberts, Burlington, N.C., assignor to Burlington Industries, Inc., Greensboro, N.C.**

**Filed Sep. 13, 1976, Ser. No. 722,754**

**Int. Cl.[2] D04B *9/24, 9/54***

**U.S. Cl. 66—172 E** **4 Claims**



1. A stocking having a single thickness throughout the length thereof, comprising

a topmost course comprising both elastic yarn and inelastic yarn jersey stitches with *x* wales, wherein *x* is an integer greater than one,

a second course comprising only inelastic yarn jersey stitches, said second course and all succeeding courses having 2*x* wales,

a third course comprising both elastic yarn and inelastic yarn jersey stitches,

a fourth course comprising only inelastic yarn tuck-stitches,

a plurality of alternate courses of floated elastic yarn and inelastic yarn and a plurality of intervening courses of only inelastic yarn providing a relatively wide mock ribbed section, and

an inelastic yarn sock body portion including a toe.

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**4,109,493**

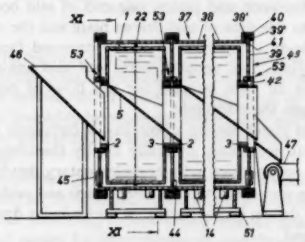
## DRUM-TYPE MACHINE FOR THE TREATMENT OF TEXTILE MATERIAL

**Ernst Hugenbruch, Glockenstrasse 25, 4000 Düsseldorf, Fed. Rep. of Germany**

**Filed Feb. 23, 1976, Ser. No. 660,276**

**Int. Cl.[2] D06F *31/00***

**U.S. Cl. 68—27** **16 Claims**



1. Drum-type machine for the thermal dry or wet treatment of textile material, comprising at least one rotatable, approxi-

mately horizontal drum having an axis, an outside surface and two end walls, the drum being surrounded by a nonrotatable housing with end walls, a drive mechanism connected with the drum by a drive means, characterized in that two radially externally exposed bearings spaced from one another in the axial direction of the drum are provided at least in the proximity of the end walls of the drum, the drive means being placed about the drum between the bearings approximately in the center of the drum for contacting the outside surface of the drum and for transmitting the drive force to the drum, the end walls of the drum being provided with central openings for charging and unloading of the textile material, the openings being surrounded by connection pipes forming a portion of the bearings, the bearings being fashioned as slide bearings including bearings shells integral with the end walls of the housing, and further comprising a plurality of drums supported in housings and arranged one behind the other in axial alignment with common bearing shells between adjacent drums, the bearing shells cooperating with the connection pipes of two adjacent drums for forming a sliding bearing thereat.

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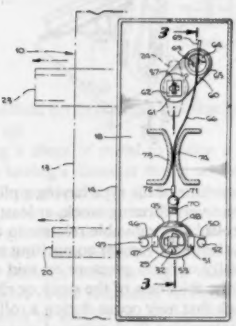
**4,109,494**

## SIMULTANEOUS RETRACT MECHANISM

**James G. Allemann, Santa Ana, Calif., assignor to Norris Industries, South Gate, Calif.**

**Filed May 31, 1977, Ser. No. 802,042**
**Int. Cl.² E05B *59/00***
**U.S. Cl. 70—107** **8 Claims**



1. In a locking device for a door comprising a knob and spindle actuator for a latch bolt for shifting said latch bolt between latched extended and unlatched withdrawn positions, and a dead bolt shaft for a dead bolt lock assembly for shifting a dead bolt between a locked extended position and an unlocked withdrawn position, a linkage comprising a lever arm having a captive end nonrotatably attached to the spindle, a bell crank arm having a captive end nonrotatably attached to the dead bolt shaft and a connector between said bell crank arm and said lever arm, said connector comprising a single flexible member having a fixed attachment to the free end of one of said arms and a second attachment to the free end of the other of said arms, said second attachment being movable endwise relative to said free end of the other of said arms in one direction and immovable endwise relative to said free end of the other of said arms in the other direction whereby the bell crank arm is rotated in response to the action of the lever arm and the lever arm remains undisturbed by rotation of the bell crank arm.

**4,109,495**

## KEY AND TUMBLER CONSTRUCTION

**Marvin E. Roberts, 2305 S. Arlington Ave., Reno, Nev. 89509**

**Continuation-in-part of Ser. No. 671,010, Mar. 26, 1976, abandoned, which is a continuation of Ser. No. 505,367, Sep. 12, 1974, abandoned. This application Jun. 27, 1977, Ser. No. 810,508**
**Int. Cl.² E05B *15/14, 19/02, 29/08***
**U.S. Cl. 70—365** **6 Claims**

1. A key construction for use in cooperation with a lock incorporating rotary disc tumblers, said key having an elongate shank of a generally rectangular shape, said shank having two bittable portions formed thereonto, each of said portions extending lengthwise along said shank, said portions positioned opposite one another with said shank being centrally disposed therebetween, each of said portions being formed as truncated cylindrical segments whose common axis is coincidental with the rotational axis of said key, said shank being formed longitudinally parallel to its rotational axis in any one of a plurality of cross-sectional configurations, each of said configurations being formed with a maximum width across said cross-section of a lesser width than the width of either of said bittable portions.

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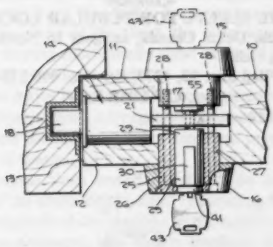
**4,109,496**

## TRAPPED KEY MECHANISM

**James G. Allemann, Santa Ana, and Michael W. Grey, South Gate, both of Calif., assignors to Norris Industries, South Gate, Calif.**

**Filed Dec. 20, 1977, Ser. No. 862,558**
**Int. Cl.² E05B *11/00***
**U.S. Cl. 70—380** **8 Claims**



1. A trapped key mechanism for a security type dead locking bolt provided with a rotatable hub in roll back association with the locking bolt for shifting the locking bolt between extended locked position and retracted posiiton, and an inner key actuated mechanism having an inner tail piece in operative engagement with the hub, said inner key actuated mechanism comprising a cylinder, and a cylinder plug having a keyway therein for reception of a key, said plug being rotatably mounted in the cylinder for key operation between an initial position wherein the locking bolt is withdrawn and positions rotatably removed from initial position wherein the locking bolt is extended, there being a sheer line between said plug and said cylinder with spring actuated tumblers acting between said plug and cylinder

across said sheer line, a drive washer for said inner tail piece in axial alignment with the plug and having a drive slot therein, a guide washer intermediate the plug and the drive washer, a spring urged drive pin intermediate the plug and the guide washer and a drive pin guide hole through the guide washer slidably receiving said guide pin and having a position of alignment with the drive slot in said initial position of the keyway, and resilient return means acting between the drive washer and the drive pin guide washer biased to normally urge the drive pin guide washer toward a position effecting disengagement of said drive pin from said drive slot at only said initial position, whereby said key is trapped in said keyway at all positions other than said initial position.

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**4,109,497**

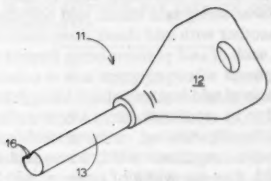
## KEY CONSTRUCTION

**Marvin E. Roberts, 2305 S. Arlington Ave., Reno, Nebr. 89509**

**Continuation-in-part of Ser. No. 671,010, Mar. 26, 1976, abandoned, which is a continuation of Ser. No. 505,367, Sep. 12, 1974, abandoned. This application Jun. 27, 1977, Ser. No. 810,506**

**Int. Cl.² E05B *19/02***

**U.S. Cl. 70—403** **5 Claims**




1. A key construction prior to code bittings being formed thereinto, said key having a generally circular cylindrical shank, said shank being formed with a vee-shaped groove thereinto, see vee-groove being formed with two sides intersecting in a substantially straight line at the base of said vee-groove, said vee-groove being formed longitudinally along said shank parallel to the axis thereof, said vee-groove having a depth radially into said shank less than the major radius of said shank.

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**4,109,498**

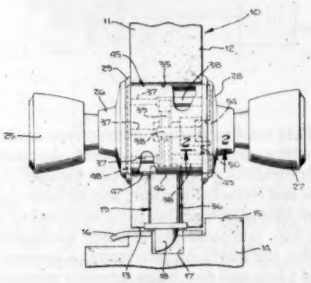
## FIRE SLEEVE FOR TUBULAR LOCKS

**Hagen Dietrich, Delta, Canada, assignor to Norris Industries, South Gate, Calif.**

**Filed Jun. 23, 1977, Ser. No. 809,175**

**Int. Cl.² E05B *9/04***

**U.S. Cl. 70—449** **6 Claims**



1. In a tubular type lock installation for a door of conventional thickness having a bore therethrough from one face to the other having a length equal to the door thickness and wherein the tubular type lock has a latch bolt subassembly extending from one side and a trim liner and trim cover in overlying relationship, a radially inwardly extending flange on the trim cover spaced from the trim liner forming with the liner a perimetrically located recess means therebetween on one face only of the door, the improvement comprising a fire resistant split sleeve of metallic material having a length at least equal to the length of the bore and a plurality of tabs with end edges of substantially reduced thickness adjacent one end only projecting radially outwardly beyond the perimeter, said sleeve having a potentially outwardly urged condition with a diameter greater than the diameter of the bore and subject to compression to a diameter wherein said tabs lie radially inwardly of the perimetrically located recess means and substantially in diametrical alignment in operative condition, said sleeve in operative condition being partially expanded to a size wherein the perimetrical surface of the sleeve is in substantial engagement with the wall of the bore and the end edges of the tabs are projected into the recess means.

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**4,109,499**

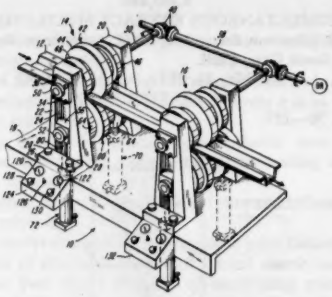
## ROLL FORMING APPARATUS AND METHOD

**Barlow W. Brooks, and Barlow W. Brooks, Jr., both of Anchorage, Ky., assignors to Roll Forming Corporation, Shelbyville, Ky.**

**Filed Feb. 16, 1977, Ser. No. 769,225**

**Int. Cl.² B21D *5/14***

**U.S. Cl. 72—181** **29 Claims**



1. In a roll forming machine of the type having a plurality of pairs of rolls for progressively forming stock, at least one roll of one of said pairs of rolls being movable relative to the other roll of said pair of rolls, the improvement comprising means for maintaining a substantially uniform pressure on said rolls and the stock regardless of the thickness of the stock or changes in the thickness of the stock that may occur during a roll forming operation, said means comprising fluid operated means including fluid operated actuators pressing said one roll toward said other roll, and means for adjusting the pressure maintained on said rolls comprising adjustable fluid pressure regulator means.

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**4,109,500**

## CREATING LINES OF WEAKNESS IN SHEET MATERIAL

**Jozef T. Franek, Chorleywood, England, assignor to Metal Box Limited, Reading, England**

**Filed Sep. 23, 1974, Ser. No. 508,625**

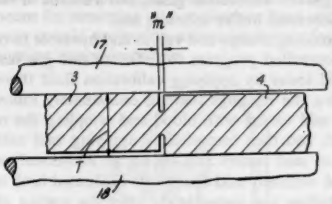
**Claims priority, application United Kingdom, Sep. 27, 1973, 45195/73**

**Int. Cl.² B21B *15/00***

**U.S. Cl. 72—203** **6 Claims**

1. Apparatus for making lines of weakness in sheet material, said apparatus comprising at least a pair of parallel rotating shafts having at least one cutter on each of said shafts, said cutters being axially offset and spaced apart transversely of said shafts to coact and cause partial slitting of material conveyed between them, said cutters being operative to offset

adjacent portions of sheet material on opposite sides of a line of weakness formed therein out of an original plane of the sheet




material, and means for urging the resultant offset sheet material portions back toward a generally planar state.

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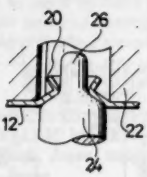
**4,109,501**

## METHOD FOR THE PRODUCTION OF HEAT EXCHANGER FINS

**Toyoo Kozima, Tokyo, Japan, assignor to Hidaka Engineering Co., Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 604,306, Aug. 13, 1975, Pat. No. 4,055,067. This application Mar. 14, 1977, Ser. No. 777,326**
**Claims priority, application Japan, Sep. 11, 1974, 49-103808**
**Int. Cl.² B21D *31/02***
**U.S. Cl. 72—327** **4 Claims**




1. A method for producing heat-exchanger fins. comprising the steps of:

piercing a sheet of metal to define a plurality of apertures each having a diameter that is smaller than the diameter of the flanged apertures that are to be ultimately formed,

burring said apertures to form a cylinder-like projection having a diameter smaller than the diameter of the flanged apertures to be ultimately formed by using a plurality of first punches each having a diameter smaller than the diameter of the ultimately formed flanged apertures and a plurality of first dies each receiving said punches; and

ironing said cylinder-like projections to form a plurality of flanged apertures of the desired dimention by using a second plurality of punches and dies that have a diameter larger than the first plurality of punches and dies.

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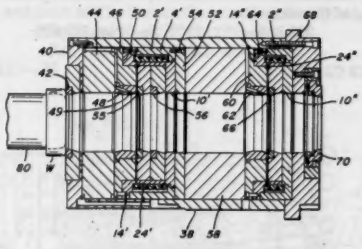
**4,109,502**

## CAN MAKING

**Dennis A. Schaffer, Hendersonville, Tenn., assignor to Carmet Company, Pittsburgh, Pa.**

**Filed Aug. 26, 1977, Ser. No. 827,908**
**Int. Cl.² B21D *22/28***
**U.S. Cl. 72—349** **12 Claims**

1. A die container comprising an outer ring, two inwardly extending radial members secured to said outer ring in axially spaced relationship so as to provide a peripheral space, a floating ring having a length less than the axial length of said space positioned at the inner end of said space, said floating ring having an outer diameter substantially less than the inner diameter of said outer ring, at least three segments in said space surrounding said floating ring, the thickness of each segment being less than the average distance between said die ring and the outer wall of said peripheral space, resilient means urging




said segments inwardly, and means concentric with the normal axis of the die for limiting inward movement of said segments.

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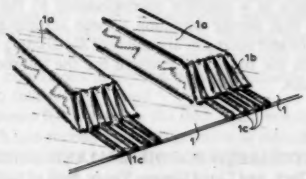
**4,109,503**

## METHOD FOR MANUFACTURING METALLIC RIBS ON SHEET STOCK

**Jean Francon, rue de la Veronniere, and Francis Francon, rue Ennemond Richard, both of 42400 Saint-Chamond, France**

**Filed Feb. 2, 1977, Ser. No. 764,969**
**Claims priority, application France, Feb. 2, 1976, 76 03795; Jun. 15, 1976, 76 19008**
**Int. Cl.² B21C *37/02***
**U.S. Cl. 72—352** **11 Claims**




1. The process of forming a sheet at low pressure to produce therein a longitudinal corrugation having a major length of large cross-section and having ends of minor length which gradually taper from the large cross-section of the major length into the plane of the sheet, the outermost ends of the tapered ends stoping substantially short of the adjacent ends of said sheet, said process comprising:

forming the major length and the two tapered minor lengths of said longitudinal corrugation between matched male and female die members by closing and pressing said die about said sheet;

whereby excess sheet material tends to be present in the region of the sheet longitudinally extending from the ends of the longitudinal corrugation to the adjacent edge of the sheet and whereby said excess material in said region tends to produce wrinkles;

forming a plurality of parallel mini-corrugations in said region with the length of each mini-corrugation being parallel to the length of the longitudinal corrugation and each mini-corrugation being located so that it intersects one of said tapered ends;

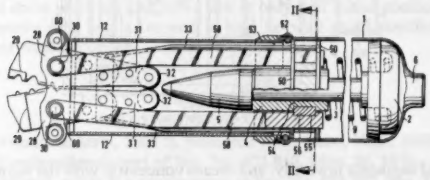
whereby said mini-corrugations absorb said excess material while protruding from the plane of said sheet only a minor fraction of the corresponding protrusion of said longitudinal corrugation; and

whereby the corrugated sheet produced by the process does not wrinkle from excess material in said region, and will, with the corrugation protruding upwardly from the plane of the sheet, lie flat.

## 4,109,504
## CRIMPING TOOL FOR PRODUCING SOLDERLESS PERMANENT ELECTRICAL CONNECTIONS

Reiner Rommel, Moldaustrasse 6, 3570 Stadt Allendorf, Fed. Rep. of Germany

Filed Apr. 22, 1977, Ser. No. 789,878
Int. Cl.[2] B21D *7/06*
U.S. Cl. 72—407 18 Claims



1. A crimping tool comprising, in combination: cheek plates; an axially reciprocating piston; a lever drive; said cheek plates being closed and opened by said axially reciprocating piston via said lever drive; securing means linked to said piston drive and operating as a function of the piston motion, said securing means permitting interruption of the piston drive only after complete closure of said cheek plates; said securing means comprises guide means on an actuating lever for turning on and off said cheek plate drive and extending in the direction of piston movement; an abutment slidable along said guide means and located on said piston; said guide means having on one end a point of engagement and having on the other end a point of disconnection at a distance corresponding to the full piston stroke, so that during actuation of said actuating lever said guide means and abutment are engaged for holding said actuating lever in the turned-on position for the duration of a full piston stroke.

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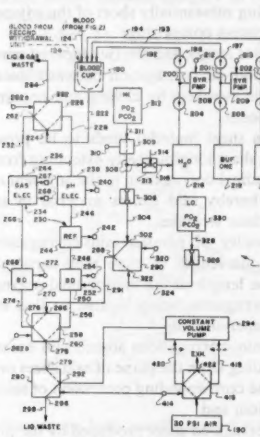
## 4,109,505
## AUTOMATED BLOOD ANALYSIS SYSTEM

Justin S. Clark, and Lloyd George Veasy, both of Salt Lake City, Utah, assignors to Primary Children's Hospital, Salt Lake City, Utah

Division of Ser. No. 490,603, Jul. 22, 1974, Pat. No. 3,910,256, which is a division of Ser. No. 319,561, Dec. 29, 1972, Pat. No. 3,838,682. This application Apr. 7, 1975, Ser. No. 566,023
Int. Cl.[2] G01N *27/26*
U.S. Cl. 73—1 R 9 Claims



1. An automated blood unit to provide a fool proof safety check against calibration drift comprising:

a blood gas tester;

a blood pH tester;

fluid source means providing a source of blood, a source of blood gas test calibration gases, and a source of blood pH test calibration buffer solution; and

means including pumps and valves and operable in response to a controlled program to calibrate said gas tester and said pH tester by applying calibration fluid thereto and sampling the readings thereof, immediately followed by filling said testers with blood and sampling the readings thereof, and then immediately applying said calibration fluids to said testers and taking an additional sampling thereof, whereby said testers are calibrated both immediately before and immediately after the testing of blood such that blood test results may be discarded if before and after calibration readings differ.

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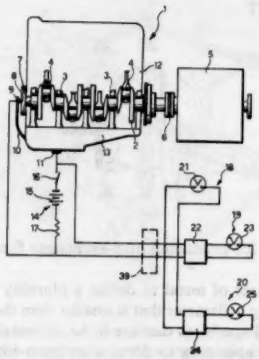
## 4,109,506
## DEVICE FOR MONITORING THE LUBRICATION OF THE CRANKSHAFT OF A RECIPROCATING INTERNAL COMBUSTION ENGINE

Cesare Bassoli, and Giorgio Cornetti, both of Turin, Italy, assignors to FIAT Societa per Azioni, Turin, Italy

Filed Nov. 14, 1977, Ser. No. 851,565
Claims priority, application Italy, Dec. 2, 1976, 69882 A/76
Int. Cl.[2] G01M *15/00*
U.S. Cl. 73—10 5 Claims



1. In a device for testing the lubrication of the crankshaft of a reciprocating internal combustion engine, said device being connectable to a potentiometer circuit having first and second electrodes, said first electrode being connected electrically to said crankshaft and said second electrode being connected electrically to the engine block, said device including at least a first detector unit including an averaging voltage detector,

the improvement wherein:

said device also inlcudes a second detector unit,

means connecting said second detector unit in parallel with said averaging voltage detector across said potentiometer circuit, said second detector unit comprising a first threshold discriminator circuit, and

a second averaging voltage detector, connected to the output from said threshold discriminator circuit.

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## 4,109,507
## RECIRCULATING SHOT TESTING DEVICE

Robert J. Neidigh, Bremen, Ind., assignor to Wheelabrator-Frye Inc., Mishawaka, Ind.

Filed Aug. 16, 1977, Ser. No. 825,092
Int. Cl.[2] G01N *3/08*
U.S. Cl. 73—12 8 Claims

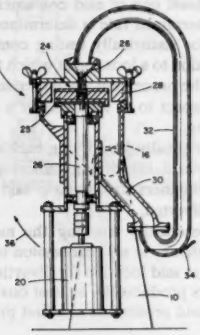
1. A device for life testing particulate comprising:

(a) a target,

(b) means for projecting said particulate against said target at high velocity, said target and said projecting means mounted on a frame,

(c) means for collecting spent particulate, and

(d) means for returning said particulate from said collecting means to said projecting means by force of gravity, said returning means including



(i) means for rotating said frame at a selected speed,

(ii) a recirculating tube communicating said collecting means with said projecting means,

whereby rotation of said frame causes substantially all of said particulate to move by force of gravity from said collecting means into and through said recirculating tube back to said projecting means.

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**4,109,508**

## METHOD OF DETECTING A SURFACE FLAW OF METALLIC MATERIAL

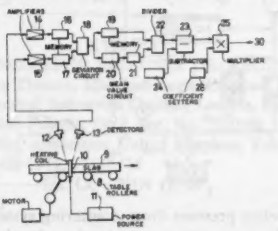
**Masaru Fukuyama, Himeji, Japan, assignor to Nipponn Steel Corporation, Tokyo, Japan**

**Filed Apr. 30, 1976, Ser. No. 682,023**

**Claims priority, application Japan, Jun. 26, 1975, 50-79905**

**Int. Cl.[2] G01N *25/72***

**U.S. Cl. 73—15 FD** **6 Claims**



1. A method for detecting a surface defect or flaw of metallic material, comprising the steps of:

detecting the surface temperature of the metallic material in a linear manner;

subjecting the surface layer of the metallic material to high-frequency induction heating;

detecting the surface temperature of the same portion of the metallic material as that detected before induction heating;

determining a deviation signal between the surface temperature detected before and after induction heating;

determining a mean value signal of temperature rise from said deviation signal; and

determining the depth of the surface defect or flaw as a function of the ratio of the deviation signal to the mean value signal of temperature rise.

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**4,109,509**

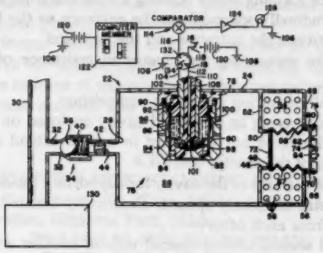
## OXYGEN MONITOR AND WARNING DEVICE FOR AN AIRCRAFT BREATHING SYSTEM

**Robert L. Cramer, and John W. Henneman, both of Davenport, Iowa, assignors to The Bendix Corporation, Southfield, Mich.**

**Filed Sep. 30, 1977, Ser. No. 838,278**

**Int. Cl.[2] G01N *31/00*; A62B *7/14***

**U.S. Cl. 73—23** **11 Claims**



1. In an aircraft breathing system having a sensor for monitoring the concentration of oxygen in a source of breathable fluid supplied to a recipient, means for developing a minimum constant absolute pressure in a sample of breathable fluid to maintain the accuracy of the sensor within acceptable limits above a predetermined altitude, said means comprising:

a housing having a chamber therein, said chamber being connected to said sensor, said chamber having a first port connected to said source of breathable fluid and a second port connected to the surrounding environment, said sample of breathable fluid flowing through said chamber to the surrounding environment to provide said sensor with a continuous indication of the breathable fluid supplied to said recipient; and

aneroid means for restricting the flow of the breathable fluid through said second port as a function of altitude to establish said minimum constant absolute pressure in said sample.

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**4,109,510**

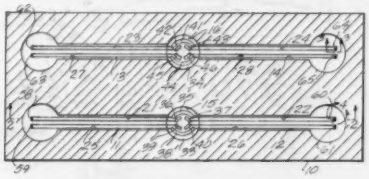
## FLUID MEASURING APPARATUS

**Jerome A. Rodder, 774 Sunshine Dr., Los Altos, Calif. 94022**

**Filed Apr. 14, 1977, Ser. No. 787,468**

**Int. Cl.[2] G01N *27/04*; G01F *1/68***

**U.S. Cl. 73—27 R** **19 Claims**



1. Fluid measuring apparatus comprising:

a housing having an elongated cavity enclosed on its sides;

a first thin elongated hot wire bent in half to extend along the length of the cavity away from a junction;

a second thin elongated hot wire bent in half to extend along the length of the cavity away from the junction;

first means at the junction for supporting the ends of each hot wire in spaced electrically isolated relationship from each other and connecting one end of the first and second hot wires to each other to form in effect a first single hot wire equal in length to the first and second hot wires;

second means spaced along the length of the cavity from the junction for supporting the middle of the first hot wire to

exert tension thereon as the length of the first hot wire changes;

third means spaced along the length of the cavity from the junction for supporting the middle of the second hot wire to exert tension thereon as the length of the second hot wire changes;

means for forming in the housing a fluid entrance to the cavity;

means for forming in the housing a fluid exit from the cavity longitudinally spaced from the entrance so the hot wires lie between the entrance and the exit; and

means for measuring the change in resistance of the hot wires.

17. Fluid measuring apparatus comprising:

a housing having an elongated cavity enclosed on its sides;

a thin elongated hot wire bent in half to extend along the length of the cavity;

means at one area of the cavity for supporting the ends of the hot wire in closely spaced, electrically isolated relationship from each other;

first and second closely spaced rods at another area of the cavity spaced from the one area to support the middle of the wire, the middle of the wire being wrapped around the rods and the rods being deformed to exert tension on the hot wire to keep the hot wire taut as its length changes;

means for maintaining the spacing of the first and second rods;

means for forming in the housing a fluid entrance to the cavity;

means for forming in the housing a fluid exit from the cavity longitudinally spaced from the entrance so the hot wire lies between the entrance and the exit; and

means for measuring the change in resistance of the hot wire.

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## 4,109,511

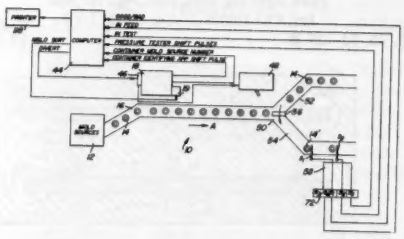
## METHOD AND APPARATUS FOR STATISTICALLY TESTING FRANGIBLE CONTAINERS

**Whitney S. Powers, Jr., Pine City; Ross L. Hobler, Elmira; Nelson H. Bryant, Ithaca, all of N.Y., and Wilbur J. Allen, Millerton, Pa., assignors to Powers Manufacturing, Inc., Elmira, N.Y.**

**Continuation-in-part of Ser. No. 712,991, Aug. 8, 1976, Pat. No. 4,081,991. This application Dec. 16, 1976, Ser. No. 751,786**

**Int. Cl.[2] B07C *5/34;* G01M *3/36***

**U.S. Cl. 73—37.6** **19 Claims**



6. A method of automatically upgrading a procession of containers produced by plural container mold sources, comprising:

automatically identifying each container produced by said plural container mold sources,

diverting selected identified containers produced by at least one preselected mold source to a pressure test station at a first predetermined rate under computer control

automatically pressure testing the containers diverted at the first predetermined rate to determine whether each diverted container is defective,

selectively diverting other identified containers produced by said preselected mold source at a second predetermined rate effectively greater than said first predetermined rate if at least one of said tested containers is determined to be defective,

automatically pressure testing the containers diverted at the second predetermined rate to determine whether each such diverted container is defective, and

automatically rejecting all other identified containers produced by said preselected mold source over a fixed period of time if at least one of said containers diverted at the second predetermined rate is determined to be defective.

17. Apparatus for statistically testing containers which are moved in a procession to a location at which the containers can be diverted from the procession, each container having identifying indicia in respect to at least one of a plurality of mold sources, comprising:

means for automatically identifying each of said containers according to said identifying indicia provided thereon before said containers are moved to said location at which they can be diverted,

means for automatically tracking the movement of each identified container in said procession to said location,

means disposed at said location for diverting selected identified containers produced by at least one preselected mold source from said procession at a first predetermined rate, and

a test station for testing a physical property of said diverted containers automatically and for providing a signal indicative of whether each tested container is defective.

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## 4,109,512

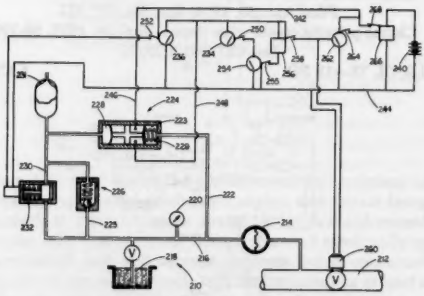
## LINEBREAK DETECTION SYSTEM

**Howard L. Ledeen, Pasadena, and Franz Schmon, Granada, both of Calif., assignors to Ledeen Flow Control Systems, Sun Valley, Calif.**

**Continuation-in-part of Ser. No. 718,757, Aug. 30, 1976, Pat. No. 4,051,715. This application Sep. 29, 1977, Ser. No. 837,684**

**Int. Cl.[2] G01M *3/28***

**U.S. Cl. 73—40.5 R** **5 Claims**



1. A pipeline pressure drop monitoring system comprising:

means for transmitting an actuating signal in response to each decrease in pipeline pressure of a given increment;

timing means activated by receipt of an acutating signal to deliver an energizing signal for a predetermined period;

output means conditioned while a said energizing signal is imposed thereon to deliver an action signal after a timed delay longer than said predetermined period;

said output means comprising;

a source of electricity;

electrical circuit connected from said source to said output means; and

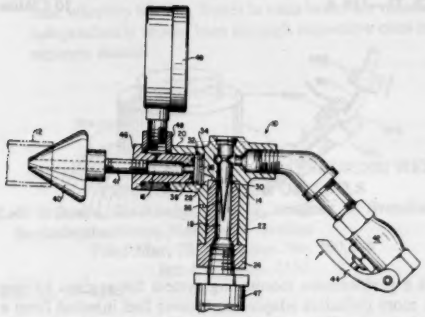
a normally-open, on delay relay having a switch connected in parallel in said circuit and adapted to be closed after a time delay cycle;

said time delay cycle being longer than said predetermined period and being initiated and continued while a said energizing signal is imposed thereon.

## 4,109,513
## LEAK DETECTOR APPARATUS

Donald E. Schott, Chester, Vt., assignor to Thomas C. Wilson, Inc., Long Island City, N.Y.

Filed Oct. 22, 1975, Ser. No. 624,910
Int. Cl.[2] G01M 3/28
U.S. Cl. 73—49.1 32 Claims

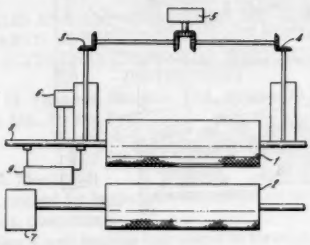


1. An apparatus adapted to be positioned in adjacent engaged relation with a member defining a confined space for creating at least a partial vacuum in said confined space which comprises: housing means having a first section and a second section, said second section being angled relative to said first section and configured for gripping; induction means operatively connected to said housing means for selectively inducing sub-atmospheric fluidic pressure therein; valve means operatively positioned within said housing means to selectively permit fluidic communication between a source of relatively compressed fluid and the housing means and between said induction means and said confined space, said valve means including at least a first valve device movable by forces generated within the housing at least to a closed position which forces urge said valve device along a predetermined linear path generally parallel to the axis of said first housing section so as to move said valve device into engagement with a corresponding valve seat so as to seal off fluidic communication between said confined space and induction means to maintain the partial vacuum thereby produced in said confined space for enabling testing of said confined space for fluidic leaks.

## 4,109,514
## RHEOMETER AND USES THEREOF

David Hamilton Thomas, Middlesbrough, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Feb. 11, 1977, Ser. No. 767,948
Claims priority, application United Kingdom, Feb. 17, 1976, 6183/76; May 19, 1976, 20676/76
Int. Cl.[2] G01N 11/00
U.S. Cl. 73—58 15 Claims



1. A rheometer which comprises:
(a) two rollers disposed in spaced-apart relationship with their axes parallel and located so that they can be placed into contact with opposite sides of a material under test said rollers being rotatable relative to one another while remaining in contact with said material, and means for adjusting the distance between said rollers so that test material of varying thicknesses can be accommodated in the space between them in contact with both rollers under constant and predetermined pressure,
(b) means for rotating one of said rollers and,
(c) means for maintaining the material under test under constant pressures by the surfaces and,
(d) a torque measuring device connected to one of said rollers for measuring the torque imparted to the latter upon rotation of and said roller when test material is under pressure between said rollers.

## 4,109,515
## PHOTOELASTIC STAMPING ANALYSIS

Willard E. Swenson, Jr., Troy, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

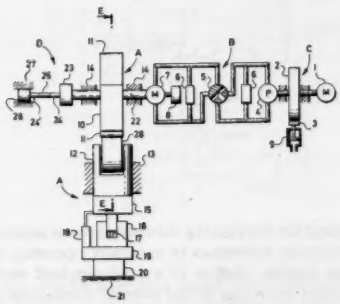
Filed May 10, 1976, Ser. No. 684,526
Int. Cl.[2] G01N 3/28; G01B 11/18
U.S. Cl. 73—88 A 20 Claims

1. A method of analyzing formability, strain level, or a related physical characteristic of a given material for a blank which is formed into a desired shape comprising:
providing a blank of said given material;
applying a flowable photoelastic coating as a single layer directly on a selected surface area of the blank which is to be analyzed and allowing the single layer to fully cure and itself form a tenacious bond directly to the surface of the blank material;
then forming the coated blank into the desired shape; and subjecting the coating to analysis;
wherein the perimeter of said selected surface area is dammed prior to application of the coating thereto so as to contain the flowable coating within the selected surface area.

## 4,109,516
## CAM PLASTOMETER

Jan Fuxa, Ostrava, Czechoslovakia, assignor to Vyzkumny ustav hutnictvi zeleza, Dobra, Czechoslovakia

Filed Mar. 23, 1977, Ser. No. 780,315
Claims priority, application Czechoslovakia, Apr. 2, 1976, 2148/76
Int. Cl.[2] G01N 3/00
U.S. Cl. 73—93 1 Claim



1. A dynamic cam plastometer for simulating multiple deformation processes, comprising:
a rotatable disc cam having a plurality of peripheral lobes;
a first shaft for rotating said disc;
a second shaft coupled for rotation with said first shaft;
a torsion element connected to said second shaft;

a hydromotor connected to said first shaft for rotating said shafts and said disc in accordance with a hydraulic control signal corresponding to the magnitude and direction of the desired shaft rotation for rotating said first shaft through a predetermined number of revolutions in accordance with a preset deformation vs. time profile;

a hydraulic control circuit for generating said control signal, said circuit comprising programming means including a coding disc coupled to said first shaft, a regulating pump and a hydraulic distributor coupled between said pump and said hydromotor;

means for disposing a first specimen to be tested between said torsion element and a fixed support;

a cam follower comprising a roller contacting the periphery of said disc, and a displaceable follower element coupled to the roller for linear movement in response to rotation of said cam;

a rigid jaw coupled to said follower element; and

means for disposing a second specimen to be tested between said jaw and a fixed rigid surface.

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**4,109,517**

## METHOD AND APPARATUS FOR CONTROLLING THE CORRECT ANGULAR ADJUSTMENT OF PERIODIC INJECTION OPERATIONS

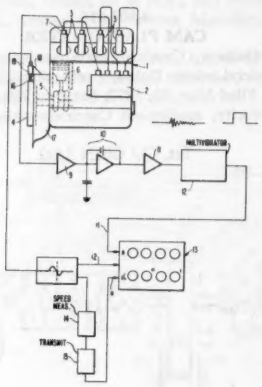
**Manfred Dyballa, Aichwald, and Dieter Schutzenauer, Schorndorf, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Aug. 20, 1976, Ser. No. 716,204**

**Claims priority, application Fed. Rep. of Germany, Aug. 21, 1975, 2537219**

**Int. Cl.[2] G01M *15/00***

**U.S. Cl. 73—119 A** **60 Claims**




1. A method for determining the correct phase adjustment of periodic injection operations in cyclically operating internal combustion engines relative to a predetermined movement phase of drive unit parts of the internal combustion engine, comprising the steps of acoustically determining the closing of an injection valve of a working space of the engine while the internal combustion engine rotates, determining the time interval between the beginning of the noise representative of the closing of the injection valve with respect to the predetermined movement phase of the drive unit parts belonging to the working space, and utilizing the thus-determined time interval at least indirectly as control value.

**4,109,518**

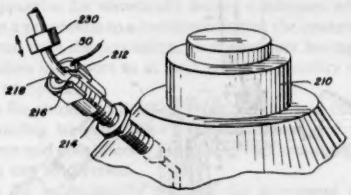
## ENGINE MONITORING APPARATUS

**Joseph L. Dooley, Chicago, and Edward Yelke, La Grange, both of Ill., assignors to Creative Tool Company, Lyons, Ill.**

**Division of Ser. No. 670,058, Mar. 24, 1976, Pat. No. 4,036,050. This application May 11, 1977, Ser. No. 796,008**

**Int. Cl.[2] G01M *15/00***

**U.S. Cl. 73—119 A** **10 Claims**




1. In a performance monitoring system for engines having one or more cylinders adapted to receive fuel injected from a pump through a line and wherein said fuel line is normally terminated at one or more of its ends in a fitting which is sealed by a nut which surrounds the line, a transducer assembly for developing an electrical signal in response to fuel pressure tending to separate the fuel line from said fitting comprising a nut-shaped housing having a first cutaway portion extending axially along one side thereof to allow said housing to be placed around the fuel line, a stress responsive transducer material coupled to said housing for producing an output signal in response to mechanical stress on said housing, said transducer assembly being adapted to replace the nut on said line in coupling said line into sealing engagement with said fitting.

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**4,109,519**

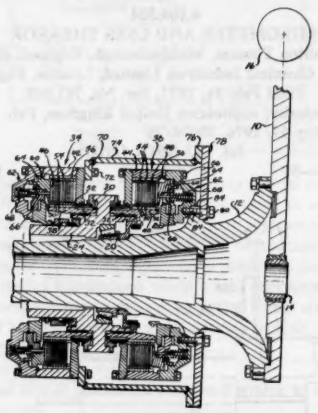
## DYNAMOMETER EMPLOYING MULTIPLE DISC BRAKE ASSEMBLIES

**Harold H. Bartlett; Charles H. Herr, Jr., and Ivan R. Lamport, all of Peoria, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Jul. 18, 1977, Ser. No. 816,640**

**Int. Cl.[2] G01L *3/18***

**U.S. Cl. 73—135** **6 Claims**



1. In a dynamometer, the combination of:

a base; means, including a shaft, adapted to be coupled to a rotary motive source to be tested;

a pair of axially spaced, fluid-cooled, disc brakes concentric about said shaft and each having two relatively rotatable

members, one of said members of each brake being journalled on said shaft and being affixed to said base thereby journalling said shaft on said base, the other of said members being connected to said shaft for rotation therewith;

load measuring means connected to each said one member; and

separate means connecting each said one member to said base whereby braking forces in each brake are transmitted independently to said base through respective ones of said separate means.

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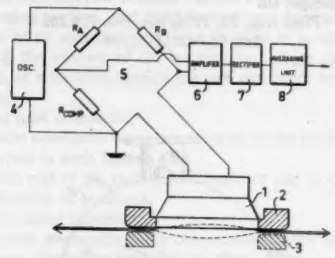
**4,109,520**

## METHOD AND MEANS FOR MEASURING WEB TENSION IN PAPER OR FOILS

**Leif Eriksson, Stockholm, Sweden, assignor to Svenska Traforskningsinstitutet, Stockholm, Sweden**

**Filed Mar. 23, 1977, Ser. No. 780,518**
**Int. Cl.² G01L 5/10**
**U.S. Cl. 73—143** **8 Claims**




1. A method for measuring the web tension of a running paper or foil web member under tension and having a resonant frequency related to the tension in the web, including the steps of supporting the member in a preselected area including a plurality of spaced supports longitudinally spaced in a direction along the web, subjecting the preselected area of the web to transverse oscillations of constant frequency, said transverse oscillations having an amplitude between two limit values proportional to the web tension, and coupling a measuring means to said area and generating a signal proportional to the amplitude of the transverse oscillations, said frequency selected to approach the fundamental resonant frequency of the web for said web tension.

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**4,109,521**

## METHOD AND APPARATUS FOR LOGGING INCLINED EARTH BOREHOLES USING THE MEASURED ACCELERATION OF THE WELL LOGGING INSTRUMENT

**Arthur H. Youmans, Houston, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.**

**Filed Oct. 3, 1977, Ser. No. 838,682**
**Int. Cl.² E21B 47/00**
**U.S. Cl. 73—151** **7 Claims**

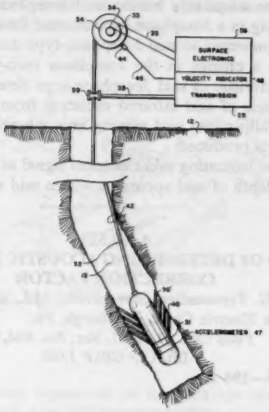
5. A method for logging the formations surrounding an earth borehole, comprising:

causing a well logging instrument to traverse an earth borehole by means of a well logging cable from the earth's surface;

measuring the velocity of said cable at the earth's surface;

measuring the velocity of said well logging instrument;

comparing the said cable velocity with the said instrument velocity and generating a signal indicative of the comparison; and




activating means within said instrument responsive to said signal which facilitates the movement of said instrument through said borehole.

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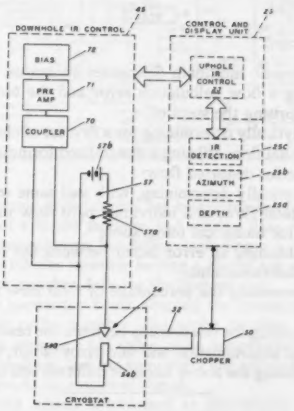
**4,109,522**

## METHOD OF BOREHOLE LOGGING USING PASSIVE JOSEPHSON CURRENT DETECTOR TO DIRECTLY DETERMINE THE PRESENCE OF HYDROCARBONS

**Don D. Thompson, Corona Del Mar, Calif., assignor to Chevron Research Company, San Francisco, Calif.**

**Continuation-in-part of Ser. No. 526,441, Nov. 22, 1974, abandoned, which is a continuation of Ser. No. 241,504, Apr. 6, 1972, abandoned. This application Nov. 4, 1976, Ser. No. 738,990**
**Int. Cl.² E21B 49/00**
**U.S. Cl. 73—154** **23 Claims**




1. Apparatus for indicating the presence of hydrocarbons in an earth formation traversed by a wellbore by passively detecting infrared radiation therefrom due principally to stretching vibration having frequency components in a range of 8400 to 9600 gigahertz, comprising:

a tool housing for traversing said wellbore;

a Josephson-type detector tuned to operate with maximum response in a frequency range of about 8400 to 9600 gigahertz, comprising at least two superconducting bodies

positioned within said tool housing defining a current path through a sensing area therebetween;

means for selectively biasing said Josephson-type detector resulting in a Josephson-type current flow;

means connected to said Josephson-type detector for monitoring a change in the Josephson zero-voltage current characteristic of said Josephson-type detector due to the incidence of said infrared radiation from said hydrocarbons falling into said sensing area whereby an electrical signal is produced;

means for indicating said electrical signal as a function of at least depth of said apparatus within said wellbore.

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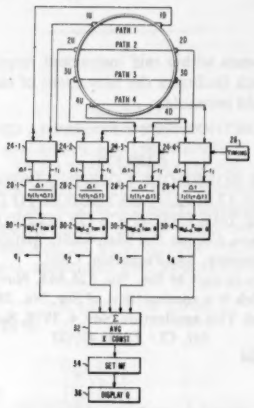
**4,109,523**

## METHOD OF DETERMINING ACOUSTIC FLOW METER CORRECTION FACTOR

**Raymond G. Teyssandier, Stevensville, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Oct. 21, 1977, Ser. No. 844,155**
**Int. Cl.² G01F *1/66***
**U.S. Cl. 73—194 A** **4 Claims**




1. In acoustic multipath flowmeter apparatus, a method of establishing a flow calculation error and the bounds on that error comprising the steps of:

(A) analytically determining for a first set of chosen parameters, total flow utilizing a generalized formula for velocity profile for distorted flow;

(B) analytically determining, with said same set of parameters, total flow, and individual path flow utilizing a formula for numerical integration;

(C) establishing an error factor between the results of said two determinations;

(D) determining the percentage of total flow for each said path;

(E) recording the relationship between the results of said last named determination and said error factor; and

(F) repeating the above steps for different sets of parameters.

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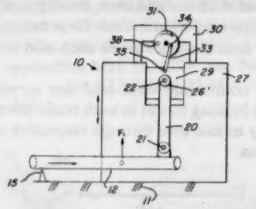
**4,109,524**

## METHOD AND APPARATUS FOR MASS FLOW RATE MEASUREMENT

**James E. Smith, Boulder, Colo., assignor to S & F Associates, Boulder, Colo.**

**Filed Jun. 30, 1975, Ser. No. 591,907**
**Int. Cl.² G01F *1/80***
**U.S. Cl. 73—194 B** **9 Claims**

8. A method for measuring fluid mass flow through a conduit comprising: inducing fluid flow through at least one conduit section, angularly oscillating at least the one section of the conduit around a pivot point located at an end of the conduit section, and intermittently measuring the torque induced in the



conduit section by the fluid flow when the angular velocity of the conduit section is maximum.

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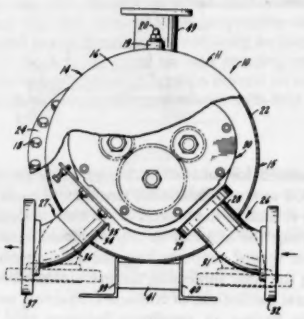
**4,109,525**

## MAXIMUM STRENGTH/WEIGHT FLUID METERING DEVICE

**William Jordan Kolb, III, Waukegan, and Karl Otto Laurel, Gurnee, both of Ill., assignors to Liquid Controls Corporation, North Chicago, Ill.**

**Filed Aug. 31, 1976, Ser. No. 719,265**
**Int. Cl.² G01F *15/18***
**U.S. Cl. 73—201** **2 Claims**



1. In a fluid meter system,

a meter, said meter including

displacement mechanism, and a meter housing which encloses said displacement mechanism,

said meter housing having an inlet and an outlet,

an outer housing for supporting and enclosing the meter,

said outer housing being non-integral with the meter and including

a first, generally hemispherically shaped portion, and

a second, generally hemispherically shaped portion,

said first and second hemispherically shaped portions being constructed and adapted to make abutting contact one to the other along a parting line which generally bisects the hemispherical configuration formed by said portions when assembled one to another, said parting line lying substantially in a single plane,

each of said hemispherically shaped portions having a peripheral flange,

each of said peripheral flanges extending radially outwardly from the center portion of its associated hemispherical portion and being adapted to make abutting contact one to the other when said hemispherical portions are assembled,

an inlet opening and an outlet opening in one of the said hemispherical portions only,

seal means carried by one of said housing portions for making a fluid tight pressure seal with the other of said housing portions,

said inlet opening and said outlet opening being arranged ralative to one another such that a uni-directional line passing through the central portion of the inlet opening and the outlet opening does not intersect the generally circular plane formed by the parting line,

a rigid, upstream conduit in the said one outer housing portion terminating, at its interior, downstream end, at a location within the said one outer housing portion and, at its exterior, upstream end, at a location outside the said one outer housing portion,

means for mounting said meter on the interior, downstream end of said rigid conduit and thereby in a fixed position with respect to the outer housing and in communication with said outer housing inlet,

said mounting means including structure for orienting the meter in any desired one of a plurality of positions with respect to the horizontal, including a position in which the inlet and outlet openings in the said one hemispherical portion are each located vertically above the meter,

a rigid downstream conduit carried by the said one outer housing portion, said rigid downstream conduit terminating, at its upstream end, at a location in communication with the interior of the housing and, at its downstream end, at a location outside the said one outer housing portion,

a rigid inlet connector,

said inlet connector being connectable to the rigid, upstream conduit in such fashion that

the inlet end of the rigid inlet connector can be disposed in a plurality of positions,

a rigid, outlet connector,

said outlet connector being connectable to the rigid downstream conduit in such fashion that

the outlet end of the rigid outlet elbow can be disposed in a plurality of positions,

whereby fluid may be admitted to the outer housing from a plurality of approach directions, and discharged in a plurality of departure directions irrespective of the approach direction, including a position in which fluid is admitted to, and discharged from, the outer housing from an elevation above the meter, and

meter counting shaft means extending outwardly from said metering device and through the wall of said housing in sealed relationship therewith and into contact with auxiliary equipment irrespective of the relative position of the meter to the inlet and outlet openings of the said one hemispherical portion.

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## 4,109,526
## TURBINE METER FOR BI-DIRECTIONAL MEASUREMENT OF FLUID FLOW

**John B. Rosso, Tulsa, Okla., assignor to Combustion Engineering, Inc., Windsor, Conn.**

**Filed Aug. 8, 1977, Ser. No. 822,488**
**Int. Cl.[2] G01F *1/115, 23/00***
**U.S. Cl. 73—231 R** **5 Claims**

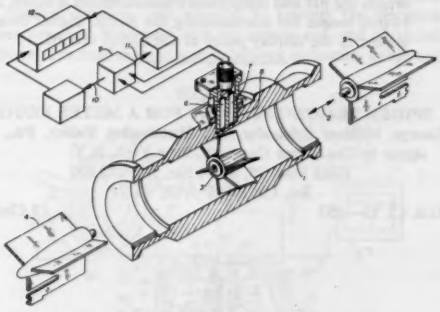
1. A system measuring the flow of fluids in a single path in either of the two directions along the path, including,

a turbine meter with a plurality of metallic blades rotating in a plane normal the path and each blade positioned to provide a cross-section at an angle to the plane of rotation,

a first magnetic pick-up unit mounted at the periphery of the blade tips to generate a first output pulse as each blade tip cuts the magnetic lines of force established by the unit,

a second magnetic pick-up unit mounted at the periphery of the blade tips and in an alignment with the first unit to form an angle with the blade cross-section, whereby the second magnetic pick-up unit generates a second output pulse at a time different than the generation of the first output pulse as each blade tip cuts the magnetic lines of force established by the second unit,

electronic gates connected to the pick-ups to receive the train of pulses from both pick-ups,



a sensing circuit connected to the pick-ups and gates to control which gate will pass the pick-up pulses,

and a counter connected to the gates to accumulate the pulses in the manner dependent upon which direction the turbine meter blades rotate.

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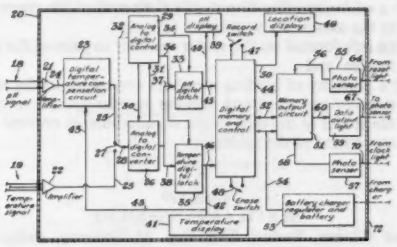
## 4,109,527
## DEVICE FOR MEASURING PH AND TEMPERATURE OF A LIQUID, WHICH INCLUDES A MEMORY

**John V. Goode, Jr., Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Oct. 26, 1976, Ser. No. 735,234**
**Int. Cl.[2] G01K *1/02***
**U.S. Cl. 73—343.5** **5 Claims**



1. An electronic probe device for measuring the pH and the temperature of a liquid medium and storing data relating to said pH and temperature, the device including:

an elongate tubular member having a closed top end, and a connector member defining the bottom end;

the bottom connector being adapted for connection to an electronic probe member, the probe member including means for sensing a pH value and a temperature value in a liquid medium, and for converting the pH and temperature values to an electrical signal;

a display box which is attached to the tubular member, which includes a display panel at the top end of the box, and which includes a first transfer panel at the bottom end of the box;

the display panel being adapted for displaying a digital record corresponding to the pH value, the temperature value, and a given location at which each pH and temperature value is obtained;

an electronic master memory system which is contained within the display box, and which is connected into the pH and temperature sensing means of the probe member;

the master memory system including a power source, means

for controlling the pH and temperature signals to meet analog-to-digital requirements, means for converting the analog data to digital data, means for storing the digital data relating to pH and temperature values, means for storing data in digital form which relates to the location at which the pH and temperature measurement is taken, and switch means for commanding the stored digital data to appear in the display panel as the digital record.

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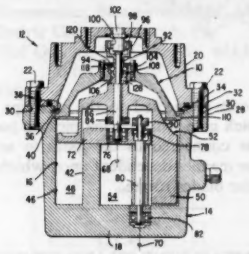
**4,109,528**

## SPIDER BEARING SUPPORT FOR A METER ROTOR

George William Schneider, Jr., Huntingdon Valley, Pa., assignor to The Singer Company, New York, N.Y.

Filed Mar. 29, 1977, Ser. No. 782,602
Int. Cl.[2] G01F *3/08, 15/14*
U.S. Cl. 73—253 12 Claims



1. A bearing support for a rotor journaled in a housing comprising:
(a) a counterbore axially extending in the housing adjacent one end thereof,
(b) an annular groove formed in the counterbore axially spaced from the bottom thereof,
(c) a spider member disposed in the counterbore concentric to the axis of the rotor,
(d) a hub formed on the spider member to journal the rotor therein, and
(e) a plurality of holding members connected to the spider member and to extend into the annular groove to clamp the spider at the base of the counterbore to prevent axial movement of the spider.

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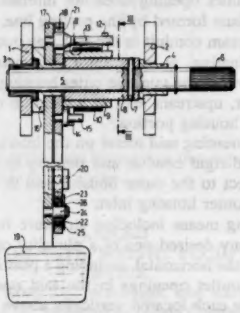
**4,109,529**

## SERVO ARRANGEMENT

Bernd Niklaus, Rastatt, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jul. 29, 1977, Ser. No. 820,130
Claims priority, application Fed. Rep. of Germany, Aug. 31, 1976, 2637213
Int. Cl.[2] F16H *35/00;* G05G *1/14;* F16D *65/14, 11/06*
U.S. Cl. 74—388 R 14 Claims

1. A servo arrangement, especially for brake force amplifiers for automotive vehicles, comprising cylinder means mounted for rotation about its axis and adapted to be driven by a servomotor in one direction about said axis; power take-off means; operator controlled force applying means; elastically deformable means connecting said operator controlled force applying means with said power take-off means; coupling means for transmitting the moment imparted to said cylinder means by the servomotor to said power take-off means, said coupling means comprising a multicoil spring wound about said cylinder means and having a hook-shaped end which, as considered in the direction of rotation of said cylinder means, constitutes a rear end of said coil spring, and an opposite front end portion constituted by at least a first quarter of the first winding of the coil spring which extends in spiral form radially outwardly; and means for rendering said coupling means active and inactive in dependence on the elastic deformation of said deformable connecting means and comprising a first entrainment member connected to said power take-off means and adapted to engage said hook-shaped rear end of said coil spring, upon actuation of said force applying means to apply a tension force to the latter to tightly engage the peripheral surface of said rotating cylinder means, and a second entrainment member



connected to said operator controlled force applying means and adapted to engage said front end portion of said coil spring, when said force applying means is not actuated, tending thereby to bend the latter outwardly so that the coil spring may slip on the peripheral surface of said cylinder means.

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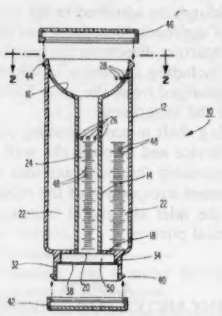
**4,109,530**

## SPECIMEN TRANSFER CONTAINER

Hyun Jung Kim, Cherry Hill, N.J., assignor to Steven M. Diamond, Easton, Pa., a part interest

Filed Apr. 29, 1977, Ser. No. 792,214
Int. Cl.[2] G01F *11/28*
U.S. Cl. 73—427 4 Claims



1. A transfer container for the receiving, storing and dispensing of liquid specimens including:
a cylindrical first storage chamber having an open top inlet and an open bottom outlet;
a sealed annular second chamber encircling said first storage chamber, being concentric therewith, and having a common wall therebetween;
an outwardly open receiving basin forming the upper wall of said second storage chamber and having a discharge outlet connected to said open top inlet of said first storage chamber;
first passage means interconnecting said first storage chamber and said second storage chamber, said first passage means consisting of a plurality of apertures in said common wall between said first storage chamber and said second chamber at a location above said bottom outlet in said first storage chamber, whereby liquid in said first

storage chamber can overflow into said second storage chamber;

second passage means interconnecting said second storage chamber and said receiving basin, said second passage means consisting of a plurality of apertures in the common wall between said basin and said second storage chamber, whereby liquid in said second storage chamber can flow into said basin; and

normally closed closure means adapted to open selectively open said bottom outlet of said first storage chamber.

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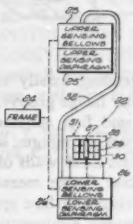
**4,109,531**

## FLUID SENSING SYSTEMS

**Victor N. Lawford, Pasadena, and David F. Sacarisen, Saugus, both of Calif., assignors to International Telephone and Telegraph Corporation, New York, N.Y.**

**Filed Jul. 11, 1977, Ser. No. 814,317**
**Int. Cl.[2] G01N 9/26; G01F 23/14**
**U.S. Cl. 73—438** **2 Claims**




1. A densitometer comprising: a frame; first and second means fixed relative to said frame in positions at the top and bottom thereof, respectively, said first and second means including first and second hollow shells, respectively, closed on the bottom thereof by first and second bellows, respectively, each of said first and second shells being sealed but having one opening thereinto, a conduit having a first end sealed through the opening in said first shell and a second end sealed through the opening in said second shell; a first incompressible fluid filling both of said shells and said conduit; first and second diaphragms partially defining fluid tight first and second spaces with said first and second bellows, respectively; second and third incompressible fluids filling said first and second spaces, respectively, said first, second and third fluids being the same or different, both of said diaphragms facing downwardly; third means connected from one of said first and second bellows to produce an electrical output signal directly proportional to the difference between the pressure at the respective locations of said first and second diaphragms, respectively; and utilization means connected from the output of said third means.

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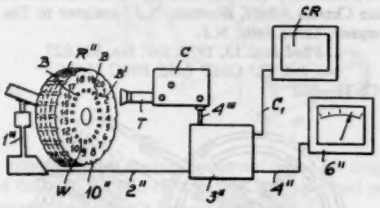
**4,109,532**

## APPARATUS FOR DETERMINING THE AMOUNT AND LOCATION OF UNBALANCE IN A ROTATING WHEEL OF A VEHICLE

**Giuseppe Donato, Via Mac Mahon, 77, Milan, Italy**

**Filed May 17, 1976, Ser. No. 687,115**
**Claims priority, application Italy, May 23, 1975, 23681 A/75**
**Int. Cl.[2] G01M 1/28**
**U.S. Cl. 73—457** **2 Claims**

1. An apparatus for determining the amount and location of unbalance in a rotating wheel of a vehicle while the wheel is mounted on the vehicle, comprising a mechanical pulse pick-up means responsive to the vibrations of the wheel to be balanced, said pick-up means being effective to convert mechanical pulses into electrical pulses, a circumferentially graduated dial adaped for removable attachment to said wheel centrally thereof for rotation therewith, said dial having a plurality of alternatingly photoelectrically activating and disactivating marks distributed over a circumference, a photocell device responsive to alternating photoelectrical activation and disactivation induced by said plurality of marks, an unbalance indicating gauge capable of indicating the amount of unbalance of the wheel to be balanced, a digital storage counter and an apparatus control circuitry unit adapted to process the electrical pulses received from said pick-up means and said photocell device and to send them to said unbalance indicating gauge and




to said digital storage counter, said digital storage counter being adapted to count the energization and de-energization of said other photocell by said plurality of marks and to store the figure corresponding to one of said marks at the maximum unbalance as indicated by said unbalance indicating gauge, thereby allowing an operator to read simultaneously said figure of maximum unbalance indicated by said digital storage counter and the amount of maximum unbalance indicated by said unbalance indicating gauge.

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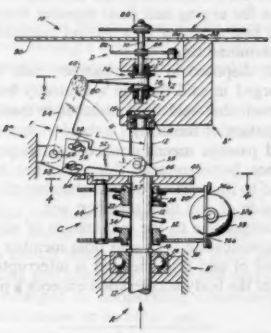
**4,109,533**

## TACHOMETER

**Richard J. Broadman, W. Simsbury, and Richard D. May, Weston, both of Conn., assignors to Jones Instrument Corporation, Stanford, Conn.**

**Filed Dec. 27, 1976, Ser. No. 754,401**
**Int. Cl.[2] G01P 3/18**
**U.S. Cl. 73—498** **31 Claims**



1. Apparatus for deflecting a pointer in proportion to the rotational speed of a shaft comprising:

(A) a support;

(B) governor means mounted on said support including an input member adapted to be operatively connected to the shaft for rotation therewith and an output member movable in a given direction to a degree generally related to the rotational speed of the shaft;

(C) indicator means including a drum rotatably mounted on said support, a pointer operatively connected to said drum for movement therewith, and a flexible member at least partially wound about said drum, said drum being rotated by the unwinding of said flexible member therefrom; and

(D) an angled lever pivotably mounted on said support with

one leg operatively bearing on said output member for motion therewith and the other leg secured to a portion of said flexible member for unwinding said flexible member from said drum, the effective angle defined by said legs being manually adjustable for calibration purposes but being fixed during normal operation of said apparatus.

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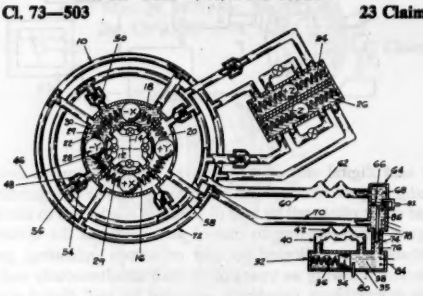
**4,109,534**

## APPARATUS FOR MONITORING ACCELERATION

**William Charles Albert, Boonton, N.J., assignor to The Singer Company, Little Falls, N.J.**

**Filed Jun. 13, 1977, Ser. No. 806,027**
**Int. Cl.[2] G01P 7/00; F42C 15/24**
**U.S. Cl. 73—503** **23 Claims**



1. An apparatus for monitoring acceleration of a body comprising;
   (a) a casing having at least one cavity disposed in a predetermined relationship to the axes of the body when secured thereto;
   (b) a proof mass disposed in said cavity, said proof mass adapted to move in said cavity in response to an acceleration of the body for a period of time, said movement proportional to the time integral of said body acceleration;
   (c) damping fluid disposed in said cavity;
   (d) a first chamber including,
      (i) a first float member disposed therein,
      (ii) means for urging said float member from a first position in said chamber to a second position therein in a predetermined time,
      (iii) fluid, disposed in said chamber, said float member submerged in said fluid in a neutrally buoyant condition, such that said float member is insensitive to the acceleration of the body,
      (iv) fluid passage means connecting the portion of said chamber between said float member and one end thereof to the portion of said chamber disposed on the other side of said float member; and
   (e) means responsive to the movements of said proof mass and communicating with said float member such that the movement of said float member is interrupted if the time integral of the body acceleration exceeds a predetermined amount.

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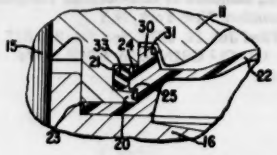
**4,109,535**

## DIAPHRAGM SEAL FOR PRESSURE SENSING INSTRUMENT

**Charles J. Reed, South Euclid, and Claren K. Cook, Aurora, both of Ohio, assignors to Ametek, Inc., New York, N.Y.**

**Continuation of Ser. No. 526,610, Nov. 25, 1974, abandoned.**
**This application Sep. 8, 1976, Ser. No. 721,437**
**Int. Cl.[2] G01L 7/08**
**U.S. Cl. 73—706** **3 Claims**

1. In a diaphragm assembly device for connecting a source of pressure to a pressure sensing instrument, the combination of a pressure responsive diaphragm consisting essentially of fluorocarbon resins a coupling flange having a coupling surface and a coupling flange recess in said coupling surface, means for connecting said recess with a pressure responsive instrument, an annular flange projection on said coupling flange at the coupling surface thereof and extending inwardly into said recess to define a first annular flange groove adjacent said projection and opening radially toward said diaphragm, a second annular flange groove formed in said flange inwardly of said first annular flange groove and opening axially toward said diaphragm, said diaphragm having a peripheral annular diaphragm groove therein defining a first annular diaphragm projection on one side thereof and a second annular diaphragm on the other side thereof, said flange projection being receivable within said diaphragm groove for releasably retaining said diaphragm on said coupling flange, a third annular projection



on said diaphragm extending axially and being receivable within said second annular flange groove, a compressible sealing ring positioned in said first annular flange groove and peripherally contacting said diaphragm, said sealing ring being entrapped between at least three walls of said flange and said diaphragm, and a process flange means connected to said coupling flange and having a surface spaced therefrom, said process flange means having a connection with a source of pressure to be sensed, said first annular diaphragm projection positioned between the coupling surface of said coupling flange and said surface of said process flange so as to grip said first annular diaphragm projection therebetween.

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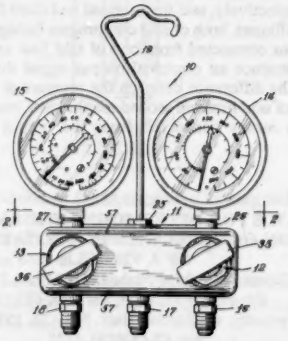
**4,109,536**

## FLUID TEST DEVICE

**Richard V. Strybel, Elk Grove Village, Ill.**

**Filed Apr. 21, 1977, Ser. No. 789,732**
**Int. Cl.[2] G01L 7/00**
**U.S. Cl. 73—756** **11 Claims**



1. A fluid test device comprising:
   a T-connector comprising an assembly of independently prefabricated machined elements including a center body defining a center port, a first transverse element secured to said center body and defining a left side port, a second transverse element secured to said center body and defining a right side port, and interconnecting passages;
   a left valve having a prefabricated machined body defining a first port arranged to be connected to said T-connector

first transverse element in communication with said left side port, a second port, and a third port;
a left gauge connected to said second port;
means defining a hose connection to said third port;
a right valve having a prefabricated machined body defining a fourth port arranged to be connected to said T-connector second transverse element in communication with said right side port, a fifth port, and a sixth port;
a right gauge connected to said fifth port;
means defining a hose connection to said sixth port, said left and right valves having front-operated manual operating means and said gauges having front-reading dials, said valves defining prefabricated machined structures;
means removably sealingly securing said valve bodies to said T-connector elements; and
an outer cover removably enclosing the assembled T-connector, left valve and right valve, said cover closely fitting said assembly and including wall portions juxtaposed to said valves and said center body to provide a compact enclosure of said T-connector and valves.

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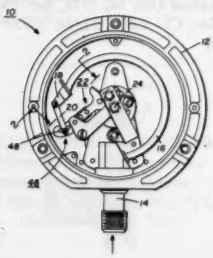
**4,109,537**
**MOVEMENT CONSTRUCTION FOR A PRESSURE RESPONSIVE INSTRUMENT**

**Joseph E. Gorgens, Trumbull, and Matthew Gerald Morris, Jr., Fairfield, both of Conn., assignors to Dresser Industries, Inc., Dallas, Tex.**

**Filed Mar. 7, 1977, Ser. No. 775,007**
**Int. Cl.[2] G01L 7/04**
**U.S. Cl. 73—756** **7 Claims**



1. In a pressure operative instrument including a Bourdon tube, a gear movement for transmitting displacement of the Bourdon tube to an output drive and link means for connecting the free end of said Bourdon tube to the input of said movement, the improvement for connecting said link means to said movement input and comprising fastener means including a nut integrally formed near one end of an elongated spring clip, support means displaced from said movement input for supporting said spring clip near its other end in a grip engagement against said movement input with its nut in fastening relation at the connecting location thereof, and screw means to cooperate with said nut for connecting said link with said nut as said connecting location.

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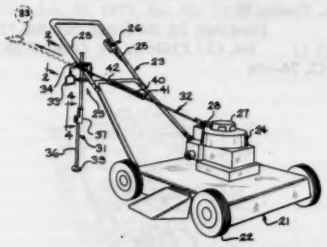
**4,109,538**
**STARTER BRACKET FOR LAWN MOWERS**

**Martin J. Glenday, 5010 Sand Lake, Rte.1, Onsted, Mich. 49265, and Cecil G. Blank, 1734 Wellesley Dr., Toledo, Ohio 43606**

**Filed Jul. 14, 1977, Ser. No. 815,725**
**Int. Cl.[2] F02N 3/02, 3/04**
**U.S. Cl. 74—6** **10 Claims**

1. A starter bracket for a machine having an engine and a pull-cord starting device, said bracket comprising, in combination,
a. a clamp for mounting said bracket in selected position on a frame that is stationary relative to the engine,
b. a post carried by said clamp that is alternatively positionable in a support position and in a storage position,



c. an extension cable having on one end means for coupling said cable to the pull-cord and on the other end means engageable by a user's foot or hand, and
d. a guide on said clamp for said cable.

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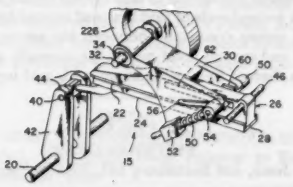
**4,109,539**
**DYNAMIC POWER BOOSTER**

**Christiaan Cornelis Feleus, P.O. Box 5035, Kent, Wash. 98031**

**Filed May 20, 1977, Ser. No. 798,927**
**Int. Cl.[2] F16H 21/38**
**U.S. Cl. 74—36** **6 Claims**

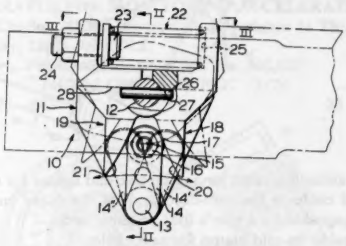


1. A dynamic power booster comprising in combination:
a. a crank lever having a first fixed pivot point and an associated power source for rotating said crank lever about said first pivot point;
b. a crank pin connected to said crank lever end portion;
c. a lever assembly having a first lever slideably connected by sliding means to a second lever;
d. said first lever connected to said crank pin;
e. a second fixed pivot point at said second lever and a sliding guide means positioned between said sliding means of said lever assembly and said second fixed pivot point;
f. a one way clutch being a third fixed pivot point;
g. an oscillating arm connected to said one way clutch at one end and arranged in cooperating connection with said sliding guide means at its other end;
h. said sliding guide means having pin means for connection to said oscillating arm and shock absorbing means pivotally connected to said pin means and mounted on said oscillating arm for preventing a dead lock condition of said oscillating arm with said lever assembly; and
i. an output shaft connected to said one way clutch; whereby upon activation of said associated power source said crank lever is rotated about said first fixed pivot point for extending and contracting said lever assembly by said crank pin in an oscillating movement about said second fixed pivot point thereby oscillating said oscillating arm through said sliding guide means about said one way clutch means for imparting an intermittent rotation to said output shaft having more torque than said associated power source input torque.

## 4,109,540
## OVERTRAVEL CONTROL MECHANISM FOR HYDROSTATIC TRANSMISSIONS

Cyril W. Habiger, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Jun. 24, 1977, Ser. No. 809,727
Int. Cl.[2] F16H *21/44*; G05G *7/04*
U.S. Cl. 74—96 12 Claims




1. A control mechanism comprising
rotary output means,
a pair of first and second lever means pivotally mounted for movement relative to said output means,
rotary input means engageable with a first end of each of said first and second lever means for alternately pivoting said first and second lever means in response to rotation of said input means in opposite directions,
drive means connected to said output means and engageable with second ends of said first and second lever means, and
spring means connected between the second ends of said first and second lever means for normally urging the first ends thereof into engagement with said input means.

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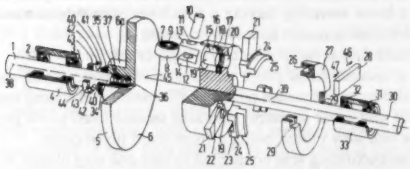
## 4,109,541
## FRICTION GEAR

Gerhard Jesse, Am Bostelkerg 147, 3001 Hellendorf, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 464,908, Apr. 29, 1974, abandoned. This application May 17, 1976, Ser. No. 686,714
Int. Cl.[2] F16H *15/08*
U.S. Cl. 74—194 23 Claims



1. An improved friction gear, with an infinitely variable transmission ratio, comprising:
a first shaft having an end and having a central, longitudinal axis about which it rotates;
a second shaft having an end and having a central, longitudinal axis about which it rotates;
means for supporting the first and second shafts for rotation so that relative movement between the rotational axes of the first and second shafts is prevented, so that the rotational axis of the second shaft is parallel to but offset from the rotational axis of the first shaft, and so that the end of the first shaft is adjacent to and faces the end of the second shaft;
an axial bearing surface means mounted on the end of the first shaft such that the bearing surface means is disposed adjacent to the end of the second shaft and in a first plane which is substantially perpendicular to the rotational axes of the first and second shafts;
at least two roller means, with each roller means having an axis about which it rotates;
means for mounting the roller means on the end of the second shaft adjacent to the bearing surface means so that the roller means run on the surface of the bearing surface means;
axially symmetrical guiding surface means having a central longitudinal axis;
means interconnecting the mounting means and the guiding surface means for aligning the roller means so that the axes of the roller means are directed towards a straight line which extends parallel to the rotational axes of the first and second shafts, which lies in a second plane defined by the rotational axes of the first and second shafts and which is coaxial with the longitudinal axis of the guiding surface means; and
means for changing the transmission ratio including means for moving the guiding surface means so that its longitudinal axis is moved in a direction perpendicular to the rotational axes of the first and second shafts in the second plane.

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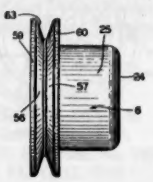
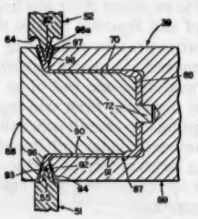
## 4,109,542
## SPUN V-GROOVED SHEET METAL PULLEY WITH THICK HUB WALL INTEGRAL WITH THIN SIDE WALL

Derald H. Kraft, Canton, Ohio, assignor to Aspro, Inc., Canton, Ohio

Division of Ser. No. 593,653, Jul. 7, 1975, Pat. No. 3,995,474. This application Oct. 14, 1976, Ser. No. 732,527
Int. Cl.[2] F16H *55/44*, *55/36*
U.S. Cl. 74—230.8 6 Claims



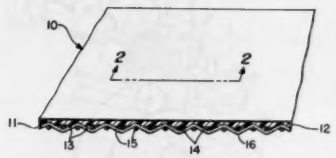

1. Spun V-grooved sheet metal pulley construction of the type having a cup shape provided with a flat circular hub wall of generally uniform metal thickness with a central opening formed in the hub wall for mounting a hub on the pulley, and a generally axially extending side wall integrally connected to the outer periphery of the hub wall and terminating in an integral pair of annular angularly extending V-groove flange walls forming a V-shaped pulley groove; the improvement in which the generally axially extending side wall has a metal thickness less than the metal thickness of the integrally connected hub wall to provide the pulley with a reinforced hub wall integral with the thinner side wall.

4,109,543

## FLEXIBLE COMPOSITE LAMINATE OF WOVEN FABRIC AND THERMOPLASTIC MATERIAL AND METHOD OF MAKING SAID LAMINATE

Anthony J. Foti, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed May 10, 1976, Ser. No. 684,827
Int. Cl.[2] F16G 1/00
U.S. Cl. 74—231 P 18 Claims




1. A composite laminated web of relatively light to medium gauge of from about 0.076mm to about 0.370mm (0.30 inches to 0.145 inches) comprised of a hot melt type thermoplastic material and a closely woven textile fabric material formed of spun yarns constructed primarily of staple polyester fibers wherein the thermoplastic material covers and is bonded to at least one face of said fabric by adhesion of the thermoplastic to minute fibrils of the spun polyester yarn and penetrates into the interstices thereof a maximum of from about 15% to about 75% but does not penetrate a substantial amount to strike through the yarn structure thereof thereby permitting an optimum amount of flexibility of said web.

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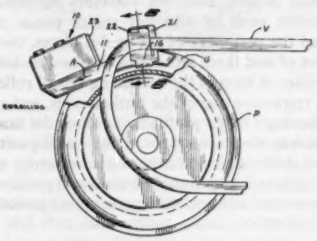
4,109,544

## V-BELT MANIPULATING TOOL

Robert E. Clark, Minneapolis, Minn., assignor to Thexton Manufacturing Company, Minneapolis, Minn.

Filed Mar. 4, 1977, Ser. No. 774,452
Int. Cl.[2] F16H 7/08
U.S. Cl. 74—242.7 14 Claims



1. A V-belt manipulating tool for use with tapered grooves of pulleys, comprising

an elongate and flexibly and compressibly resilient base of rubber-like material and having a tapered transverse shape to be received snugly into and follow the contour of the pulley groove, and

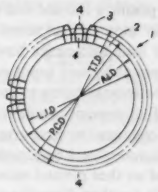
an elongate rigid ear on the base and extending outwardly therefrom to engage and manipulate a V-belt, the ear having a rigid mounting clip embracing the exterior of the elongate base and affixed thereto, the clip having a transversely tapered shape conforming to and following the tapered transverse shape of the base to lie flush against the pulley at both sides of the tapered groove of the pulley and minimize tipping of the ear relative to the pulley.

4,109,545

## NOISELESS SPUR GEARS

Enakichi Hayasaka, 543-1, Ogikubo Odawara-shi, Kanagawa-ken, Japan

Filed Jan. 26, 1977, Ser. No. 762,578
Int. Cl.[2] F16H 55/12, 55/30
U.S. Cl. 74—447 11 Claims




1. A noiseless spur gear comprising in combination:

a. a ring defining the rim of the gear;

b. radial teeth disposed around said ring, and integral therewith, said radial teeth having a greater modulus of elasticity than the ring so as to have a large backlash;

c. a holding two-disc mechanism disposed on both sides of said ring including an aperture for mounting said two discs on an axle, said aperture defining the rotational center of said gear; and,

d. holding means holding said ring including slippage means so that the rotational center of the ring may be slightly moveable in relation to said defined rotational center, whereby said construction provides for a linear inclination of the tooth center line, the elliptical deformation of the rim and the rotational vibration of the gear teeth.

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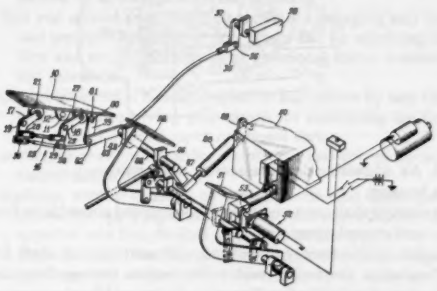
4,109,546

## COMBINED THROTTLE AND TRANSMISSION SYSTEM

James H. Povejsil, Willoughby, Ohio, assignor to Towmotor Corporation, Mentor, Ohio

Filed Jan. 17, 1977, Ser. No. 760,067
Int. Cl.[2] G05G 9/00, 1/14; F15B 15/18
U.S. Cl. 74—474 15 Claims



1. A control linkage mechanism for simultaneously and proportionately controlling a unidirectional control element and a bidirectional control element by a single control member, the combination comprising:

an operator input control member mounted for rocking motion in either direction from a neutral position;

a bidirectional control element remotely positioned from said input control member and mounted for bidirectional movement from a neutral position;

first control linkage means for connecting said input control member to said bidirectional control element for movement of said bidirectional control element in either one of two directions;

a unidirectional control element remotely positioned from said input control member and mounted for movement in a single direction from a neutral position;

second control linkage means for connecting said input control member to said unidirectional control element for movement of said unidirectional control element in a single direction from the neutral position thereof upon movement of said input control member in either direction from the neutral position thereof and comprising first and second bellcranks mounted adjacent said input control member, each of said bellcranks having a first arm disposed for engagement by said input control member, said first and second bellcranks being so mounted adjacent said pedal that pivotal movement of said input control member in one direction engages the first arm of one of said bellcranks and pivots one of said bellcranks in a first direction about its axis, and so that pivotal movement of said input control member in another direction engages the first arm of the other of said bellcranks and pivots said other bellcranks in said first direction about its axis and

link means for connecting said unidirectional control element to said bellcranks for movement therewith from its neutral position in said single direction.

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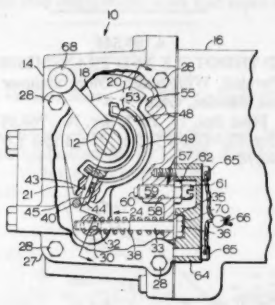
**4,109,547**

## DETENT MECHANISM

**Paul D. Jacobson, Pekin, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Jan. 17, 1977, Ser. No. 759,681**
**Int. Cl.² G05G *5/04***
**U.S. Cl. 74—526** **8 Claims**



1. An adjustable detent assembly comprising:

a housing;

a control shaft mounted in said housing and rotatable in first and second directions;

collar means fixedly associated with said control shaft for rotation therewith, said collar means having first and second radially extending projections, said first projection defining a radially oriented bore;

detent means reciprocally movable in the radially oriented bore;

resilient means mounted in said collar means for urging said detent means radially outwardly;

fixed stop means for limiting rotation of said control shaft in said first direction;

adjustable stop means for limiting rotation of said shaft in said second direction;

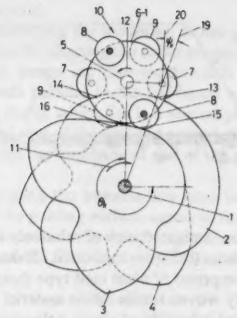
detent stop means positionable circumferentially relative said shaft and cooperating with said detent means for providing opposition to rotation of said collar means by the control shaft.

**4,109,548**

## PARALLEL INDEXING CAM STRUCTURE

**Shigeyuki Shinohara, 5-52-1-510 Jingumae, Shibuya-ku, Tokyo, and Hiroshi Makino, R1-31, 1-2-10 Kitashin, Kofu City, Yamanashi Prefecture, both of Japan**

**Filed Jul. 9, 1976, Ser. No. 704,094**
**Claims priority, application Japan, Jun. 27, 1975, 50-90840[U]**
**Int. Cl.² F16H *53/06;* B23B *29/24;* B23Q *17/00***
**U.S. Cl. 74—569** **1 Claim**



1. A parallel indexing cam structure of the type having an input shaft and an output shaft parallel to the input shaft and cam means on said shafts for causing the input shaft to control the movement of the output shaft so that the output shaft achieves controlled intermittent motion, said cam means being an improved cam means comprising:

a locking cam and a pair of further cams rigidly secured to said input shaft at predetermined angular positions relative to each other, said three cams having profiles for driving said output shaft through a predetermined angle upon rotation of said input shaft through a predetermined index angle $\theta_h$ and for causing said output shaft to undergo a dwell period during the further rotation of said input shaft through an angle of 360 minus $\theta_h$°; and

cam follower means rigidly secured to said output shaft and having a plurality of spider plates spaced in the direction of the length of said output shaft and three sets of cam follower rollers, each set rotatably mounted between respective pairs of adjacent spider plates and spaced around the periphery of the spider plates, two rollers of one set of said three sets contacting said locking cam and one roller of each of the remaining sets of rollers contacting a respective one of the further cams, and said locking cam having a larger profile circle along the cam periphery contacting the cam rollers in the dwell position of said output shaft than said further cams, whereby said locking cam holds said output shaft in the dwell position with high accuracy and stiffness during the dwell period.

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**4,109,549**

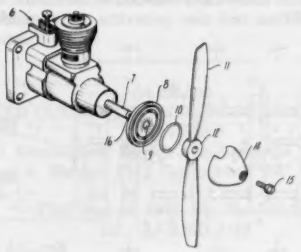
## DYNAMIC BALANCER FOR ROTATING BODIES AND METHOD OF MANUFACTURING SAME

**Raymond A. Vincent, 9307 Marion Crescent, Detroit, Mich. 48239**

**Filed Jun. 28, 1976, Ser. No. 700,084**
**Int. Cl.² F16F *15/22;* F16C *1/00;* F16D *63/00;* G01M *1/00***
**U.S. Cl. 74—573 F** **6 Claims**

1. A balancer mechanism for dynamically balancing a motor-driven rotatable assembly comprising, in combination, a body adapted to be rotated about an axis of rotation, the body having a face generally radial with respect to the said axis and having a circular shoulder on the face coaxial with the said axis in the direction away from the face so that the shoulder and the adjacent area of the face define an undercut annular recess adapted for positive retention of a slightly radially expanded

metal ring therein; a hollow substantially rigid but slightly radially expanded ring lodged in the said recess bearing against the said face and shoulder, the ring defining a closed toroidal cavity, the shoulder having a depth of slightly less than the sectional diameter of the ring before said radial expansion; and



a flowable material of substantial density contained within the said cavity, the volume of the material being within the range of approximately one-third to approximately one-half of the volume of the cavity so that the ring and flowable material are effective to counteract unbalance of the assembly during rotation thereof.

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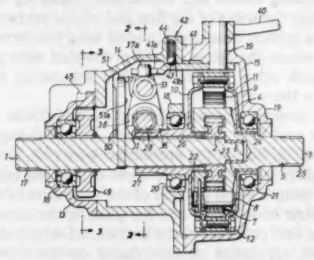
**4,109,550**
**STEPLESS SPEED CHANGE SYSTEMS**
**Yoshinobu Murayama, Sakai, Japan, assignor to Kubota Ltd., Osaka, Japan**
**Filed Feb. 15, 1977, Ser. No. 768,899**
**Int. Cl.[2] F16H *37/06, 47/04***
**U.S. Cl. 74—691** **13 Claims**



1.In a power transmission system in which the torque delivered to input means is subjected to the desired speed deduction by planetary speed reduction means and then transmitted to output means, a stepless speed change system comprising:

first transmitting means operatively connected to the input means, said first transmitting means comprising a gear mounted on an input shaft and a gear mounted on a shaft for driving a disk shaft;

second transmitting means operatively connected to an inner ring of the planetary speed reduction means, said second transmitting means comprising a worm wheel formed on an inner ring and a worm shaft having a worm meshing with the worm wheel; and

stepless speed change means provided between the first and second transmitting means and including means for operating the stepless speed change system, said stepless speed change means comprising a disk operable by said first transmitting means and provided on the disk shaft and a roller incorporated into the second transmitting means and shiftable diametrically of the disk in a direction intersecting the axis of rotation of the disk, said disk being in contact with an outer surface of the disk and the disk being pressed against the roller by hydraulic pressure, said roller further being mounted on said worm shaft rotatable therewith and shiftably axially thereof;

whereby when the operating means is operated the torque from the input means is transmitted to the inner ring to cause the inner ring to be halted or to be rotated in a positive or reversed direction with stepless speed change, the torque being transmitted also to the output means to bring the output means to a halt or into positive or reverse rotation with stepless speed change.

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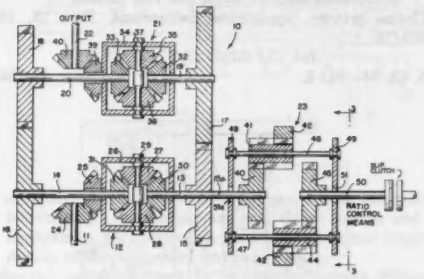
**4,109,551**
**VARIABLE SPEED GEAR RATIO TRANSMISSION APPARATUS**
**Allen R. Nemec, 5 S. 571 Tuthill, Naperville, Ill. 60540**
**Filed Jan. 12, 1977, Ser. No. 758,652**
**Int. Cl.[2] F16H *37/06***
**U.S. Cl. 74—705** **14 Claims**




1. An variable gear ratio transmission for infinite selection of speeds between the absolute operative limits thereof, said transmission comprising:

input differential means for dividing an input rotational force into first and second divided input rotational forces;

an input shaft rotationally coupled to and driving said input differential means;

first and second divided input gear means for transmitting said first and second divided input rotational forces, each of said gear means for transmitting mounted on a shaft driven by said input differential means;

first and second receiving gear means for engaging said first and second divided input gear means and for receiving the first and second divided input rotational forces transmitted therefrom;

output differential means coupled to and driven by said first and second receiving gear means for combining the first and second divided input rotational forces;

an output shaft rotationally coupled to and driven by said output differential;

inhibitor means coupled to said first divided input gear means for applying a variable load thereto, whereby the speed of said first divided input gear means may be varied with the result that the speed of said second divided input gear means is reciprocally varied, thereby to reciprocally vary also the speed of said output shaft by means of said output differential means, said inhibitor means comprising:

an inhibitor connecting gear rotationally connected to the shaft of said first divided input gear means;

a first pinion gear having a proximal longitudinal portion engaging said inhibitor connecting gear;

a stationary ring gear having interior teeth engaged by a distal longitudinal portion of said first pinion gear;

a second pinion gear having a proximal longitudinal portion engaging the teeth of said ring gear at 180° to said first pinion gear;

means for connecting said pinion gears for synchronous circular motion in said ring gear;

a variable load inhibitor control gear engaging a distal longitudinal portion of said second pinion gear;

a variable load inhibitor control shaft mounting said variable load inhibitor control gear for rotation; and

rotational control means connected to said variable load inhibitor shaft for controlling the speed of rotation thereof.

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**4,109,552**

## INDEXING MECHANISM FOR ROTATABLE ELEMENT OF MACHINE-TOOL

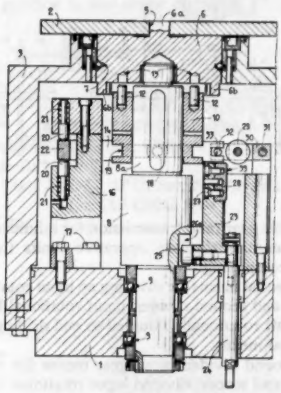
**Markus Imoberdorf, Oensingen, Switzerland, assignor to Imoberdorf & Co., Oensingen, Switzerland**

**Filed Dec. 13, 1976, Ser. No. 749,601**

**Claims priority, application Switzerland, Dec. 18, 1975, 16455/75**

**Int. Cl.² B23Q *17/02, 17/18***

**U.S. Cl. 74—813 L** **10 Claims**



1. An indexing mechanism comprising, a rotatable element, a shaft arranged coaxial to said rotatable element, a control member capable of effecting alternative go-and-back movements in a direction which is parallel to the axis of rotation of said rotatable element, means defining a groove in said shaft at least a portion of which is helicoidal means connected to said control member engaged in said groove whereby the alternative movements of the control member transmit an oscillating rotative movement to said shaft, a control cam constructed and arranged to effect go-and-back movements synchronised with the alternative go-and-back movements of said control member, a driving member, clutch means between said driving member and said rotatable element, means mounting said driving member on said shaft against angular movement relative thereto yet capable of axial movement therealong between first and second positions, the first position being a clutch engaged position whereat said driving member is rigid with said rotatable element and the second position being a clutch disengaged position whereat said driving member is not rigid with said rotatable element, said cam being effective to control the axial movements of said driving member whereby during the go movements of the control member and of the cam, the driving member engages the rotatable element while, during the back movements of the control member and of the cam, said driving member is released from said rotatable element and is disengaged from said rotatable element during the movement thereof in backward direction, and lever means establishing the connection between said cam and said driving member.

**4,109,553**

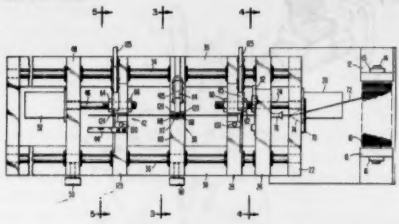
## SEMIAUTOMATIC TWISTED WIRE CABLE STRIPPER

**John Halmer Drinkard, Jr., Exton, and Charles Eugene Walton, II, Downingtown, both of Pa., assignors to Burroughs Corporation, Detroit, Mich.**

**Filed Jun. 20, 1977, Ser. No. 808,071**

**Int. Cl.² H02G *1/12***

**U.S. Cl. 81—9.51** **24 Claims**



1. An apparatus for fully stripping insulation coatings from both sets of adjacent end portions of a predetermined length of insulated and pretwisted electrical conductor wire pair and simultaneously untwisting both sets of adjacent end portions of said pretwisted electrical conductor wire pair, comprising:

a frame;

wire guiding means disposed on said frame for feeding said pretwisted wire pair substantially lineraly with respect to said frame preparatory to stripping said insulation;

center clamping means supported on said frame beyond said wire guiding means in the direction of feeding of said pretwisted wire pair and including a movable clamp for releasably gripping said pretwisted wire pair;

first spreader means supported on said frame between said wire guiding means and said center clamping means for separating the wires of the first end of said pretwisted wire pair at a section of said pretwisted wire pair between two points where the wires of said pretwisted wire pair cross over each other, whereby a first separation is created between the wires;

first wire stripper means supported on said frame and adjacent to said first spreader means for receiving the first separated section of the pretwisted wire pair, for severing the insulation of each of the wires of the first end section, for gripping the end portion of the insulation of each wire of the first end section and for guiding the untwisting of the first end portions of the pretwisted wire pair;

first means supported on said frame on the wire guiding means side of said first wire stripper means and connected to said first wire stripper means for moving said first wire stripper means toward said wire guiding means, whereby said first wire stripper means strips the insulation from the first adjacent end portions of the pretwisted wire pair and simultaneously untwists the first adjacent end portions of the pretwisted wire pair;

second spreader means supported on said frame beyond said center clamping means in the direction of feeding of said pretwisted wire pair for separating the wires of the second end of said pretwisted wire pair at a section of said pretwisted wire pair between two points where the wires of said pretwisted wire pair cross over each other, whereby a second separation is created between the wires;

second wire stripper means supported on said frame and adjacent to said second spreader means for receiving the second separated section of the pretwisted wire pair, for severing the insulation of each of the wires of the second end section, for gripping the end portion of the insulation of each wire of the second end section and for guiding the untwisting of the second end portions of the pretwisted wire pair;

second means supported on said frame beyond said second stripper means in the direction of feeding of said pretwisted wire pair and connected to said second wire strip-

per means for moving said second wire stripper means away from said center clamping means, whereby said second wire stripper means strips the insulation from the second adjacent end portions of the pretwisted wire pair and simultaneously untwists the second adjacent end portions of the pretwisted wire pair; and

means connected to said first and second moving means for simultaneously activating said first and second moving means.

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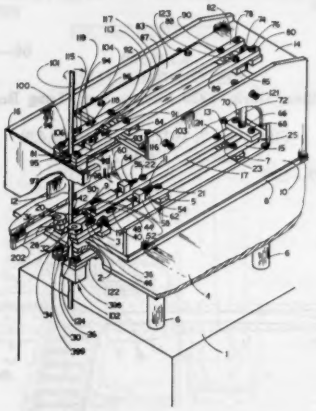
## 4,109,554
## FEED GUIDE ATTACHMENT FOR BAND SAW MACHINES

**Arthur J. Rhodes, 2601 Benoch Ave., Louisville, Ky. 40216, and William J. Rhodes, 3343 Campground Rd., Louisville, Ky. 40211**

**Filed Jan. 14, 1977, Ser. No. 759,260**
**Int. Cl.² B26D *1/54***
**U.S. Cl. 83—565** **9 Claims**



1. A guide attachment for band saw machines comprising:

a pair of parallel spaced lower support members secured to a head frame of a band saw machine, one of the lower support members extending along the front of the head frame, the other extending along the back, the lower support members being pivotally attached in substantially the center of each support member, the pivot points being in alignment with each other;

a pair of parallel spaced lower side arm link members pivotally attached at opposed ends to the lower support members;

the lower link members extending outwardly beyond the lower front support member, each lower link member having a guide roller attached at the outwardly extending portion for rotation about vertically extending parallel axes and engageable with a template; and,

cooperating means for positioning a band saw blade in parallel alignment with the contour of the outer periphery of the template.

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## 4,109,555
## UNIVERSAL DOUBLE CUT DIE SET

**Alexander Borzym, Dearborn, Mich., assignor to Alpha Industries, Inc., Detroit, Mich.**

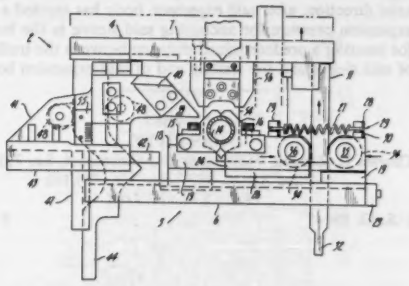
**Division of Ser. No. 695,242, Jun. 11, 1976, Pat. No. 4,036,091. This application May 27, 1977, Ser. No. 801,059**
**Int. Cl.² B26D *7/26***
**U.S. Cl. 83—700** **2 Claims**

1. In a cutoff die set including two relatively movable die shoes, and a cutoff blade mounted to one of said die shoes so as to be driven thereby, an improved mounting arrangement for said cutoff blade comprising:

means for mounting said cutoff blade;

mounting means for alternatively mounting said cutoff blade in a longitudinally offset position with respect to said one die shoe;

said mounting arrangement including a thrust surface fixed with respect to said die shoe engaging an end surface of said cutoff blade opposite the cutting edge in a first mounted position of said cutoff blade;



a clamping plate having a surface adapted to be interposed between said end surface and said thrust surface and in engagement with both of said surfaces in a second longitudinally offset position of said cutoff blade;

whereby said blade may be adapted to cutting different dimensioned workpieces along the direction of said longitudinal axis, and may be resharpened after breakage thereof.

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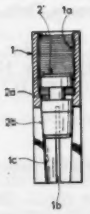
## 4,109,556
## EXPANSION DOWEL

**Helmut Vollmer, Balzers; Karl Ernst Udert, Triesen, both of Liechtenstein, and Hans Oechsle, Nenzing, Austria, assignors to Hilti Aktiengesellschaft, Schaan, Liechtenstein**

**Filed Apr. 20, 1977, Ser. No. 789,225**
**Claims priority, application Fed. Rep. of Germany, Apr. 20, 1976, 2617212**
**Int. Cl.² F16B *13/06***
**U.S. Cl. 85—84** **10 Claims**



1. Expansion dowel to be secured in a borehole comprising an axially elongated sleeve having a leading end and a trailing end with a bore extending axially therethrough from the leading end to the trailing end, said sleeve being slotted over a portion of the length thereof from the leading end toward the trailing end, the bore in said sleeve having a tapered configuration with the surface thereof diverging from the leading end toward the trailing end in the axially extending region of the slotted portion of said sleeve, an expansion body insertable into the bore in said sleeve and being disposed in surface contact with the bore at least within the tapered portion thereof and being axially displaceable therethrough for expanding said

sleeve radially outwardly into anchoring engagement within a borehole, wherein the improvement comprises that said expansion body inserted into the bore in said sleeve having a leading end facing toward the leading end of said sleeve and an oppositely directed trailing end with an axially extending front region extending from the leading end toward the trailing end and an axially extending rear region extending from the trailing end toward the leading end, and said rear region having at least one axially extending annular shaped cross sectional constriction spaced radially inwardly of the adjacent axially extending exterior surfaces of said rear region and said constriction defining a deformable section being capable of deforming in the axial direction, after said expansion body has exerted a certain expansion pressure for anchoring said sleeve in the borehole, for assuring a predetermined distance between the trailing end of said sleeve and the trailing end of said expansion body.

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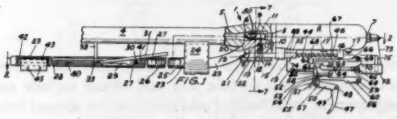
**4,109,557**
**GAS RIFLE**

**Charles D. Zaucha, 7137 Janey St., Shreveport, La. 71108**

**Filed Apr. 6, 1977, Ser. No. 785,101**
**Int. Cl.[2] F41F *1/04***
**U.S. Cl. 89—7** **9 Claims**



1. A gas rifle comprising:
(a) a barrel having a barrel bore;
(b) a combustion chamber communicating with said barrel;
(c) a breechblock pivotally mounted in said barrel and having a breechblock bore registering with said barrel bore when said breechblock is in firing configuration;
(d) loading means for supplying a projectile or bullet in said breechblock bore when said breechblock is pivoted into loading configuration;
(e) gas supply means for supplying a combustible gas and oxygen to said combustion chamber; and
(f) ignition means for supplying a spark in said combustion chamber to ignite said gas and said oxygen and propel said bullet from said barrel.

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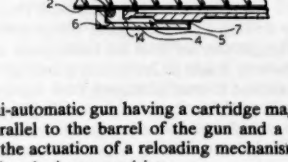
**4,109,558**
**SEMI-AUTOMATIC GUN**

**Giannantonio Panigoni, Brescia, Italy, assignor to Luigi Franchi S.p.A., Brescia, Italy**

**Filed Oct. 13, 1976, Ser. No. 732,059**
**Claims priority, application Italy, Nov. 21, 1975, 29528 A/75**
**Int. Cl.[2] F41D *5/04***
**U.S. Cl. 89—191 A** **4 Claims**



1. A semi-automatic gun having a cartridge magazine which extends parallel to the barrel of the gun and a gas operated device for the actuation of a reloading mechanism of the gun, said actuation device comprising:

a cylinder fixed to the barrel of said gun and surrounding a portion of said cartridge magazine, said cylinder and said portion of said cartridge magazine defining an annular chamber closed at one end and open at the other end;

means defining at least one gas transfer duct passing through said barrel and said cylinder;

a tubular piston surrounding said magazine and projecting at one end into said annular chamber, said piston being slidable along said annular chamber, a end face of said piston at said one end thereof and said closed end of said annular chamber defining between them a power chamber;

said tubular piston includes an outer surface and means defining at least one annular groove in said outer surface adjacent said one end of said piston, said annular groove being coaxial to said piston and having side walls of unequal height; and

a gas transfer passage communicating between said power chamber and said annular groove in said piston, said gas transfer duct which passes through said barrel of said gun and said cylinder being positioned such that gases flowing therethrough from the interior of said barrel when said gun is fired impinge upon said groove in said tubular piston.

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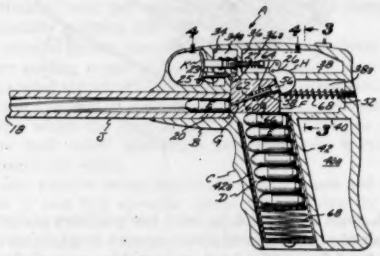
**4,109,559**
**PISTOL STRUCTURE**

**Floyd William Davis, 1320 Florida Ave., Long Beach, Calif. 90802**

**Filed Apr. 7, 1977, Ser. No. 785,438**
**Int. Cl.[2] F41D *11/02***
**U.S. Cl. 89—195** **4 Claims**



1. A pistol that includes a barrel, a housing situated rearwardly of said barrel and extending thereabove, a hollow handle depending from said housing, a spring-loaded cartridge magazine in said handle that at all times urges cartridges in said magazine upwardly, a recoil actuated assembly in said housing that includes a breech block that reciprocates between first and second positions, said breech block when in said first position permitting said spring loaded magazine to move an uppermost one of said cartridges into coaxial alignment with said barrel and when moving towards said second position forcing said uppermost cartridge into said barrel and detonating said uppermost cartridge, said pistol being characterized by a trigger assembly disposed above said barrel and longitudinally movable relative to said housing and so operatively associated with said recoil actuated assembly that when said trigger assembly is moved from a first to a second position, said uppermost cartridge is fired by movement of said breech block to said second position and said trigger assembly so long as it remains in said second position permitting cartridges in said magazine to be sequentially advanced to said firing position to be detonated by said breech block as the latter moves to said second position, said trigger assembly including a trigger disposed above said barrel and forwardly of said housing, which trigger is removably engageable by a forefinger of the hand of a user when the balance of the fingers of said hand encircle said handle and the rearward portions of said housing and handle are cradled in said hand, and the recoil force from said pistol being exerted on

substantially the center of the palm if said hand to provide a minimum of leverage, and said pistol due to said minimum leverage having a minimum tendency to pivot upwardly relative to said hand when said pistol is fired.

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4,109,560

## HORIZONTAL EXTERNAL BROACHING MACHINE

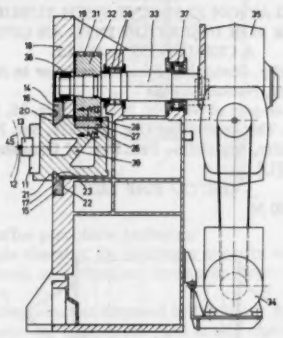
Gustav Esser, Solingen, Germany, assignor to Oswald Forst Maschinenfabrik und Apparatebauanstalt GmbH, Solingen, Germany

Filed Dec. 13, 1976, Ser. No. 750,198

Claims priority, application Fed. Rep. of Germany, Jul. 23, 1976, 2633098

Int. Cl.[2] B23D *41/08*

U.S. Cl. 90—96 4 Claims



1. A horizontal external broaching machine comprising a horizontal machine frame having respective upper and respective lower vertical and inclined guide surfaces; a horizontally movable tool slide having respective upper and respective lower vertical and inclined guide surfaces and being disposed on said horizontal machine frame, said tool slide serving to receive a broaching tool, being supported laterally and vertically by its said vertical and inclined guide surfaces on said vertical and inclined guide surfaces of said machine frame, at least two of said vertical guide surfaces of said machine frame being disposed in a common vertical plane for receiving horizontal forces and at least said lower, inclined guide surface, which is inclined in relation to the vertical and in relation to the horizontal being provided on said machine frame for absorbing vertical forces and receiving said lower, inclined guide surface of said tool slide; a toothed rack on said slide, said rack extending in direction of movement of said tool slide; a driving pinion provided with corresponding teeth meshed with said rack, said pinion being adapted to be driven via a connecting shaft by a drive motor; and wherein the center of gravity of said tool slide is disposed on one side of said guide surfaces and said rack together with said drive pinion is disposed on said one side of said surfaces, said drive pinion being arranged vertically above said rack, and said rack and said drive pinion are provided with helical teeth which during driving in a broaching direction are acted on by a force, directed in direction of said shaft connected to said drive pinion and intensifying bearing forces acting on said guide surfaces for said tool slide.

4,109,561

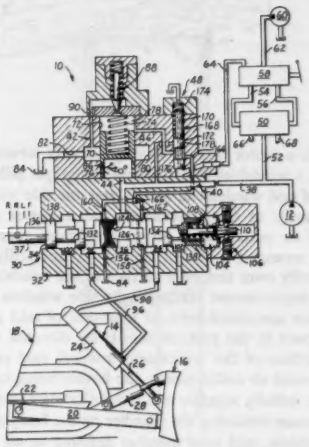
## CONTROL VALVE ARRANGEMENT WITH A PRECONDITIONED RELIEF VALVE AND A FLOW FORCE COMPENSATED VALVE SPOOL

John A. Junck, and Larry W. Lorimor, both of Joliet, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Nov. 26, 1976, Ser. No. 745,508

Int. Cl.[2] F15B *11/08, 13/04*

U.S. Cl. 91—451 6 Claims



1. In a control valve arrangement, for regulating fluid communication between a source of fluid under pressure and a double-acting motor, of the type having a housing defining a bore, an inlet chamber in communication with the bore and the pressure source, a pair of service chambers in communication with the bore and the motor for actuation thereof, and a pair of drain chambers in communication with the bore; a pressure transmitting circuit connected to the housing and in communication with the bore; a relief valve in responsive communication with the pressure transmitting circuit for variably controlling the pressure in the inlet chamber; and a single spool reciprocably disposed in the bore of the housing and having a plurality of spaced, raised lands for blocking communication between the inlet chamber, the service chambers, and the drain chambers in a neutral position; wherein the improvement comprises:

a pair of drain passages in communication with the bore;

metering slot means in the spool for communicating fluid from the inlet chamber radially outwardly to a selected one of the service chambers and to the motor for operation thereof and for communicating return fluid from the other service chamber radially inwardly to a selected one of the drain chambers in a working position; and

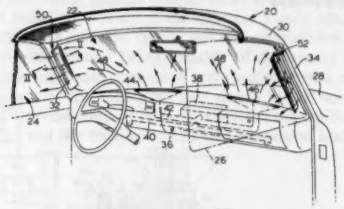
opening means in the spool for communicating the circuit with the drain passages and unloading the relief valve in the neutral position, for communicating the selected one of the service chambers to the circuit for variably loading the relief valve in a preconditioning position of the spool between the neutral and working positions, and for communicating the selected one of the service chambers to the circuit for variably loading the relief valve in the working position.

**4,109,562**

## DEFOGGING DEVICE

**Carl D. MacDonald, 17 Ottaway, Barrie, Ontario, Canada (M4L 2W6)**

**Filed Nov. 2, 1976, Ser. No. 738,263**
**Int. Cl.[2] B60H *1/24***
**U.S. Cl. 98—2.19** **7 Claims**



1. In a motor vehicle having: a body structure which includes a windshield, two generally upright pillars at opposite sides of said windshield, and at least one side window disposed rearwardly of the windshield; and a heater system having heated air outlet means adjacent a lower edge of said windshield arranged to direct heated air upwardly and laterally outwardly over the inner surface of the windshield;

the improvement comprising a side window defogging device associated with at least one of said pillars and disposed in the path of heated air directed over the inner surface of the windshield towards said pillar from said heated air outlet means, the device being manufactured as an initially separate unit and including a vane member, and means mounting the member on the body structure of the vehicle, said vane member defining an air deflecting surface which is spaced from said vehicle body structure and which is arranged to deflect approaching heated air towards the inner surface of said side window, and said mounting means including a member attached to the body structure of the vehicle, and means coupling said mounting member with said vane member, said mounting member being flexible to conform with the contour of the part of the body structure to which it is attached, and defining an attachment face having thereon a pressure sensitive adhesive coupling said member with said vehicle body structure.

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**4,109,563**

## LOW NOISE FLUID DISTRIBUTOR

**George W. Schleicher, Addison, Ill., assignor to Vapor Corporation, Chicago, Ill.**

**Filed Oct. 6, 1976, Ser. No. 730,236**
**Int. Cl.[2] F24F *13/04***
**U.S. Cl. 98—40 C** **10 Claims**

1. A low noise fluid distributor comprising a housing, said housing defining first, second, and third chambers,

said first chamber having an inlet adapted to be coupled to a source of primary fluid,

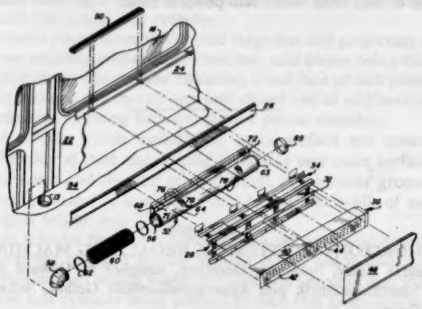
at least one fluid outlet nozzle defined in said first chamber, said nozzle defining a fluid inlet in said second chamber,

said second chamber including at least one nozzle defining a fluid outlet for said second chamber, said outlet nozzle for said second chamber in fluid communication with said third chamber,

said first chamber adapted to be in fluid communication with a source of secondary fluid, and

a fluid outlet in said third chamber adapted to allow the passage of mixed secondary and primary fluids,

said first chamber including a damper defining said outlet nozzle in said first chamber, said damper being adjustable to define the transverse dimension of said nozzle,



said damper having an arcuate configuration defining a converging-diverging nozzle.

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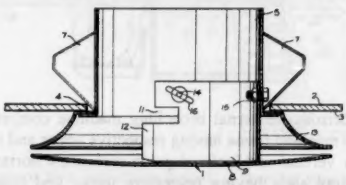
**4,109,564**

## VENTILATION ELEMENT WITH TUBULAR CONNECTOR FOR INSERTION INTO AN OPENING IN A CEILING OR A WALL

**Lennart Widerby, Jönköping, Sweden, assignor to AB Svenska Flaktfabriken, Nacka, Sweden**

**Continuation-in-part of Ser. No. 741,681, Nov. 15, 1976, Pat. No. 4,078,476. This application Dec. 28, 1976, Ser. No. 755,049**
**Claims priority, application Fed. Rep. of Germany, Nov. 19, 1975, 7537113[U]**
**Int. Cl.[2] F24F *13/00***
**U.S. Cl. 98—40 N** **6 Claims**



1. A ventilation element for mounting into an opening in a partition characterized in that said ventilation element comprises a cylindrical connector having wings extending tangentially from its outside surface, and a diffuser having a cylindrical wall telescopically introduced into said connector and interconnected by means of fasteners which are guided in oblique slots in one of said telescoping parts, said slots being inclined towards the zone of introduction in the same circumferential direction as said wings, the cylindrical wall of the diffuser being cut off in axial direction to form a radial opening and being rigidly connected to a cover disc to form a barrier against the radial flow of air beyond said radial opening.

4. A ventilation element for mounting into an opening in a partition characterized in that said ventilation element comprises a cylindrical connector having stop means for engaging one surface of the partition for limiting axial displacement of said connector through said opening, and flexible wings extending tangentially from its outside surface, said wings having an inclined surface facing said stop means at an angle less than 90° with the axial length of the connector for engaging the opposite surface of the partition affording rotation of said connector in one direction about its axis and resisting rotation of said connector in the opposite direction, and a diffuser having a cylindrical wall telescopically introduced into said connector and interconnected by means of fasteners which are

slidable and guided in oblique slots in one of said telescoping parts, said slots being inclined towards the zone of introduction in the same circumferential direction as said wings, whereby rotation of the diffuser in said one direction may rotate the connector, and rotation of the diffuser in said opposite direction affords adjustment of the diffuser axially relative to the connector.

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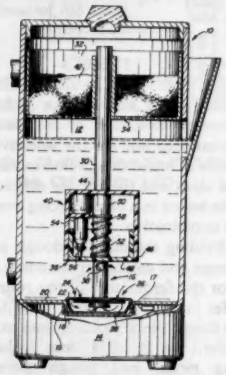
**4,109,565**
**COFFEE PERCOLATOR**

**Robert R. Tucker, 3212 E. Captain Dreyfus, Phoenix, Ariz. 85032**

**Filed Apr. 29, 1977, Ser. No. 792,466**
**Int. Cl.[2] A47J *31/053***
**U.S. Cl. 99—283** **10 Claims**



1. In a coffee percolator including:
(a) a single chamber for holding a quantity of fluid in said percolator, said chamber having an upper and a lower portion;
(b) a heating element disposed in the lower portion of said percolator for heating the fluid in said chamber;
(c) switch means including a first thermostat for initially actuating said heating element and for deactivating said heating element after the fluid attains a first temperature;
(d) pump means including a hollow tube having an upper and a lower opening and extending upwardly from the lower portion of said chamber for pumping heated fluid into the lower opening of said tube, upwardly through said tube and out of the upper opening in said tube; and
(e) a coffee ground receptacle disposed in said chamber about the upper portion of said tube and having a perforated lower surface for retaining coffee grounds, for receiving heated fluid discharged from the upper opening of said tube and for releasing heated coffee flavored fluid from the lower surface of said receptacle into said chamber;
the improvement comprising:
(a) temperature actuated pump control means coupled to said pump means for deactivating said pump means when the temperature of the fluid in said chamber is less than a second temperature below the first temperature including
(i) an aperture disposed in said pump means for releasing fluid under pressure from said pump means and thereby disabling said pump means; and
(ii) thermostatically actuated valve means for closing off said aperture when the temperature of the fluid in said chamber exceeds the second temperature and for uncovering said aperture when the temperature of the fluid in said chamber falls below the second temperature;
whereby only fluid having a temperature greater than the second temperature passes over the coffee grounds in said receptacle and the flow of heated fluid over the coffee grounds is terminated by said first thermostat when the temperature of the fluid reaches the first temperature.

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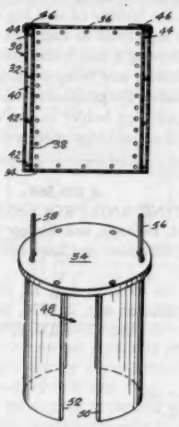
**4,109,566**
**FOOD CONTAINER HAVING ELECTRODE POCKETS**

**Knut Birger Vigerstrom, Stockholm, Sweden, assignor to Electro-Food AB, Sweden**

**Continuation-in-part of Ser. No. 292,787, Sep. 27, 1972, Pat. No. 3,877,360. This application Apr. 15, 1975, Ser. No. 568,365**
**Claims priority, application Sweden, Sep. 29, 1971, 12342/71**
**Int. Cl.[2] A23L *1/01***
**U.S. Cl. 99—358** **14 Claims**



1. A container for heating foodstuff contained therein comprising an electrically insulating outer wall forming a sealed enclosure for the foodstuff, perforated inner electrically insulating wall means within the enclosure forming at least two pockets between said inner wall means and said outer wall for receiving at least two spaced apart electrodes which are adapted to be connected to an electrical supply source, said outer wall having means defining apertures communicating with said pockets and removable closure means cooperating with said outer wall immediately adjacent said pockets for closing said apertures whereby removal of said removable closure means opens said pockets through said apertures for receiving the electrodes.

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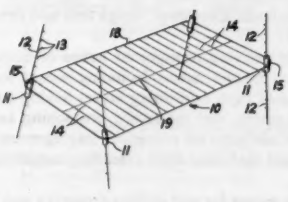
**4,109,567**
**CAMP GRILL**

**Michael H. Gage, 3505 Woodhaven Dr., Erie, Pa. 16506, and Phillip H. Zacks, 636 Hilltop Rd., Erie, Pa. 16509**

**Filed Dec. 30, 1975, Ser. No. 645,410**
**Int. Cl.[2] A47J *33/00, 37/00, 37/07***
**U.S. Cl. 99—450** **3 Claims**



1. A camp grill comprising a grill top generally rectangular in shape and having an outer marginal wire,

spaced, laterally-extending support wires having their ends supported on said marginal wire and affixed thereto,

a hollow, cylindrical leg holder fixed to said marginal wire at each corner thereof,

each said leg holder having an axially-extending slot extending from end to end therein forming a path through which lugs can move from a position spaced from one end of said cylindrical holder to a position spaced from another end of the particular cylindrical holder,

a plurality of legs,

each said leg being generally cylindrical in shape and having an outside diameter slightly smaller than the inside diameter of each said hollow, cylindrical holder and slidably received in the hollow of said leg holder,

axially-spaced lugs fixed to said legs,

each said lug having a width less than the width of said slot in said leg holder and being adapted to slide through said slot for adjusting the position of said legs and to be rotated to underlie said leg holder in use whereby said lugs support said grill on said legs selectively at different positions.

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**4,109,568**

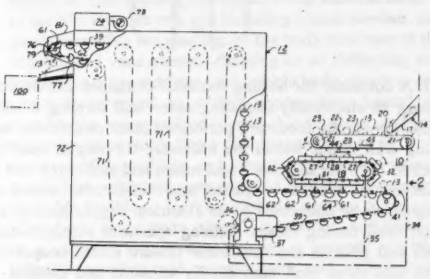
## DISTRIBUTING AND PROCESSING APPARATUS

**Frank J. Herrera, Downey, and Rodger G. Ponce, Los Angeles, both of Calif., assignors to Casa Herrera, Inc., Los Angeles, Calif.**

**Division of Ser. No. 497,006, Aug. 13, 1974, Pat. No. 3,976,188. This application Apr. 2, 1976, Ser. No. 673,188**

**Int. Cl.[2] A23L *1/00***

**U.S. Cl. 99—477** **3 Claims**



1. Apparatus for proofing lumps of dough, comprising in combination:

an endless conveyor including an endless conveyor loop and rotary means including a wheel for supporting said endless conveyor loop;

a series of first means on said conveyor for transporting lumps of dough;

a series of second means on said conveyor for transporting lumps of dough, said second means being spaced from said first means, and said first and second means being staggered relative to each other and comprising cups and means for tiltably mounting said cups on said endless conveyor loop;

means for loading lumps of dough into said first and second means;

means for deriving transported lumps of dough from said first and second means including means for selectively tilting said cups, said tilting means having a shaft for said rotary means, and means for positioning said shaft in a path of said cups for successive impingement of said cups upon said shaft, said shaft extending concentrically of said wheel;

enclosure means for said endless conveyor and said first and second means; and

means for providing inside said enclosure means a proofing environment for said lumps of dough.

**4,109,569**

## DOUGH MAKEUP LINE FOR THE SELECTIVE PRODUCTION OF DIFFERENT KINDS OF BREAD

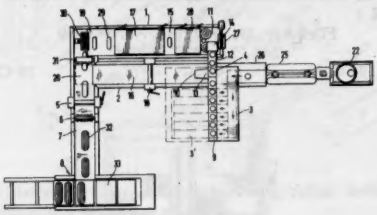
**Kate Kemper, Wybuelstrasse, 6, 8702 Zurich-Zollikon, Switzerland**

**Filed Mar. 22, 1976, Ser. No. 669,098**

**Claims priority, application Fed. Rep. of Germany, Mar. 22, 1975, 2512776**

**Int. Cl.[2] A21C *13/02, 3/02, 5/00***

**U.S. Cl. 99—483** **20 Claims**



1. A dough makeup line for the selective mechanized processing of a mass of bread dough into molded dough pieces of one of several sizes and shapes, for different kinds of bread, which are to be baked in a bread baking oven, the makeup line comprising in combination:

means for dividing the mass of dough into a succession of dough pieces and means for rounding the dough pieces;

a proofer for the fermenting of the rounded dough pieces, the proofer including a dough piece delivery device; and

at least two dough piece molding lines extending away from the proofer, the molding lines including dough piece conveying means and dough piece molding means adapted to shape the dough pieces in different ways; and wherein

the dough piece delivery device of the proofer includes means for selectively setting the delivery of the proofed dough pieces so as to take place to the one or the other of the dough piece molding lines.

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**4,109,570**

## APPARATUS FOR PITTING PEACHES

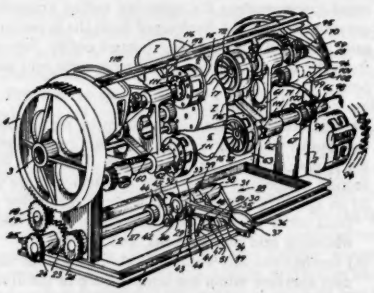
**Jesus Antonio Silvestrini, Codoy Cruz, Argentina, assignor to California Processing Machinery, San Ramon, Calif.**

**Filed Dec. 11, 1975, Ser. No. 639,706**

**Claims priority, application Argentina, Aug. 14, 1975, 260021**

**Int. Cl.[2] A23N *4/12*; A47J *25/00*; A23N *4/22***

**U.S. Cl. 99—551** **25 Claims**



1. Apparatus to part to bisect and destone fruits of the peach type comprising first means for receiving a fruit, producing a partial cut on its pulp thus defining two adhered halves and gripping the stone of the fruit while rotating same about a first axis, fluid operated means for resiliently engaging and gripping

both halves and rotating them in opposite directions about their center axis until the freeing of both halves, one with respect to the other, and of both halves from the stone, while the stone remains gripped by said first means, a supply of a fluid, communicating means for communicating said supply of fluid to said fluid operated means, first and second valve means for valving said communicating means; second means responsive to fruit being engaged by said fluid operated means to actuate said first valve means into an open mode, third means actuated responsive to a predetermined rotation of said first means to actuate said second valve means into an open mode for connecting said fluid supply to said fluid operated means, fourth means to actuate said fluid operated means in said center axis rotation mode during a predetermined rotation of said first means and fifth means responsive to a predetermined rotation of said first means and connected to said second valve means to cause release of the fruit halves and connected to said first means to cause release of the stone.

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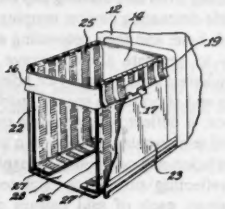
**4,109,571**

## REFUSE COMPACTION METHOD

**Charles Rogers Difley, and William Roy McDonald, both of Danville, Ky., assignors to Whirlpool Corporation, Benton Harbor, Mich.**

**Filed Jul. 14, 1977, Ser. No. 815,602**
**Int. Cl.[2] B30B *13/00***
**U.S. Cl. 100—35** **10 Claims**



1. The method of bagging refuse in a refuse compactor having an upwardly opening compaction receptacle defining an upper edge portion, an upright sidewall, and a bottom wall, comprising the steps of:

installing an upwardly opening bag in the receptacle with a bottom portion superposed on said receptacle bottom wall, a sidewall portion juxtaposed to said receptacle sidewall, and a top portion turned over said receptacle upper edge;

installing a plurality of sets of stacked paper sheets in lining relationship to said bag with the upper portions of said sheets turned over said turned-over top portion of the bag;

securing the overlying upper portions of the sheets and top portion of the bag to the upper edge portion of the receptacle;

depositing and compacting refuse in the sheet-lined bag;

releasing the secured upper portion of the sheets and top portion of the bag from the upper edge portion of the receptacle; and

gathering the upper portions of the sheets and top portion of the bag.

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**4,109,572**

## PRINTING MACHINE FOR FLAT ARTICLES

**Pierre Roulleau, 19 rue Berlioz, Oyonnax, France (01 104)**

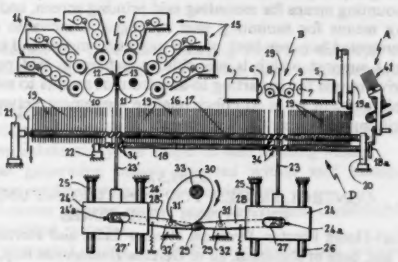
**Filed May 9, 1977, Ser. No. 795,360**
**Claims priority, application France, May 17, 1976, 76 15583**
**Int. Cl.[2] B41F *17/00***
**U.S. Cl. 101—37** **10 Claims**

1. A machine to print flat circular disc-like articles such as the central portions of phonograph records, the machine comprising:

conveyor means to advance substantially horizontally the articles to be printed standing on the conveyor means in successive substantially vertical transverse planes, the conveyor means comprising substantially horizontal parallel screws with each article to be printed being retained on edge in corresponding threads of said parallel screws, and said conveyor means having an upstream end onto which the articles are loaded;

at least one printing station disposed above said conveyor means and having means operative to contact said central portion of the article when it is raised above the conveyor means into said printing station;

vertically reciprocating means below the conveyor means and operative to raise each successive article from said conveyor means into said printing station and then lower it downwardly onto said conveyor means;



drive means for rotating in unison said screws to advance the articles, and said drive means vertically reciprocating said reciprocating means during a predetermined portion of each rotation of said screws; and

each of said screws having an expanded pitch zone of increased thread pitch located opposite to each station and reciprocating means, wherein the thread approaching the expanded zone is separate from the thread departing the expanded zone, and wherein the departing thread begins in the zone circumferentially spaced from the approaching thread by an angular displacement equal to said predetermined portion of one rotation of said screws.

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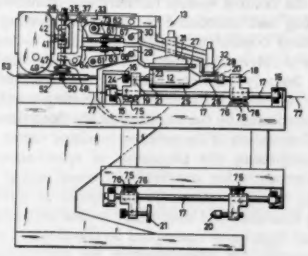
**4,109,573**

## ARTICLE, SCREEN AND SQUEEGEE DRIVE FOR SCREENPRINTER

**Karl Strauch, Kirchlengern, and Wilfried Kammann, Bunde, both of Germany, assignors to Werner Kamman Maschinenfabrik, Buende, Fed. Rep. of Germany**

**Continuation of Ser. No. 541,411, Jan. 6, 1975, Pat. No. 4,005,649. This application Jul. 6, 1976, Ser. No. 702,861**
**Claims priority, application Fed. Rep. of Germany, Jan. 22, 1974, 2402836**
**Int. Cl.[2] B41F *15/10, 15/30***
**U.S. Cl. 101—38 R** **29 Claims**



1. In a screen-printing machine for printing on rotatably-held objects of different diameters, a combination comprising support means; at least one printing staton on said support

means and past which an object to be printed travels in a path in a predetermined direction, and which includes a movable printing screen and a cooperating movable squeege; means for uniformly rotating said object to be printed at a fixed number of revolutions per unit time, including a gear and a rack extending along said path, said rack being fixed in position on said support means and located at said one printing station so as to be stationary in said direction of movement and also meshing with said gear to rotate said object at a constant rate of peripheral speed for an object of a given diameter; means for moving said squeege at a constant rate of speed; means for adjusting the speed of movement and the stroke of said printing screen whenever an object of a different diameter and therefore of a different peripheral speed than before is to be printed, whereby the periphery of each object is printed at a uniform speed; mounting means for mounting said printing screen, and mounting means for mounting said squeegee; a movable element connected between both of said mounting means and mounted on a support which is movable to-and-fro in said path; and drive means for imparting to-and-fro movements to said movable element so as to effect relative movement between said printing screen and said squeegee.

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**4,109,574**

## CONTROL SYSTEM FOR POSITIONING UNITS EXHIBITING DEAD TIMES

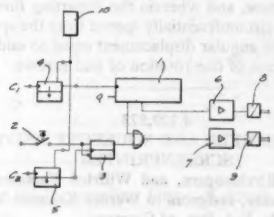
**Karl-Heinz Förster, Dresden; Werner Lein, and Hartmut Heiber, both of Radebeul, all of German Democratic Rep., assignors to Veb Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen, Leipzig, German Democratic Rep.**

**Filed Mar. 29, 1977, Ser. No. 782,541**

**Claims priority, application German Democratic Rep., Mar. 29, 1976, 192087**

**Int. Cl.² B41F *13/00, 33/16***

**U.S. Cl. 101—216** **7 Claims**



1. An improved control system for a variable-speed cyclically operating printing machine, the control system being of the type including clocked control means having a clock input receiving printing-machine-synchronized clock signals, the clocked control means being operative for generating activating signals in dependence upon the number of received clock signals, the control system furthermore including at least one positioning unit connected to receive activating signals from the clocked control means but exhibiting a dead time in its response to activating signals, the duration of the dead time not varying linearly with the speed of operation of the printing machine, whereby the fraction of a printing-machine operating cycle constituted by the duration of the dead time varies as the speed of operation of the printing machine varies, the improvement comprising the provision of speed-signal generating means operative for generating a speed signal whose value varies in correspondence to the speed of operation of the printing machine; and time-delay means connected to receive the speed signal and connected to the clocked control means and operative for compensating for the varying fractional relationship between the printing-machine operating-cycle duration and the deadtime duration by introducing, into the transmission of an activating signal from the control means to the positioning unit, a compensatory time delay whose duration varies in dependence upon variations in the value of the speed signal.

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**4,109,575**

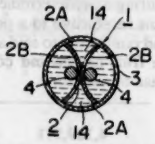
## BLASTING METHOD AND DEVICE

**Hiroshi Hashimoto, Chigasaki, Japan, assignor to Tobishima Kensetsu Kabushiki Kaisha, Japan**

**Filed Mar. 21, 1977, Ser. No. 779,658**

**Int. Cl.² F42B *3/00*; F42D *3/00***

**U.S. Cl. 102—22 R** **3 Claims**




1. In a method for blasting a rock, a concrete structure, or a like object, which comprises boring a plurality of holes in the object; placing into each of said holes a cylindrical casing containing therein an incompressible fluid such as water, an explosive substance with an electric blasting cap, and electric conductors leading from said blasting cap outward for connection to an outside detonating device; tamping a stuffing into the opening of each hole; and then detonating said explosive substance thereby to generate a shock wave in said fluid; the improvement wherein said plurality of holes are bored in the object in a row and at positions spaced apart respectively by a specific distance; a deflector comprising two reflective concave-surfaces of semicircular cross-section mutually secured in back-to-back relation and containing an explosive substance at each of said reflecting surfaces is enclosed in each of said cylindrical casings; each of said casings containing therein respectively said deflector and explosive substance is inserted into each of said holes whereafter each of said holes is stuffed by tamping; and said explosive substances in all of said holes are exploded simultaneously thereby to fracture the object in the direction along which the shock wave is transmitted.

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**4,109,576**

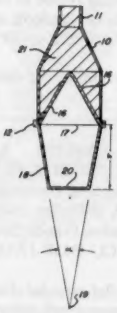
## SHAPED CHARGE WITH ENHANCED PENETRATION

**Robert E. Eckels, 2101 Youngfield, Golden, Colo. 80401**

**Continuation-in-part of Ser. No. 587,911, Jun. 18, 1975, abandoned. This application Sep. 27, 1976, Ser. No. 726,732**

**Int. Cl.² F42B *3/08***

**U.S. Cl. 102—24 HC** **17 Claims**



1. A shaped explosive charge enhancement and stand-off structure in which the shaped charge has a cone on the order

of about 60°, comprising in combination with a housing for the explosive having the cone lined.

(a) a frusto-conical rigid structure having its small end about two-thirds of the diameter of the base of the cone and perpendicular to the longitudinal axis of the cone, and its larger end about the same area as the base of the cone and perpendicular to the longitudinal axis of the cone and arranged to register with the base of the cone,

(b) the longitudinal axis of the frusto-conical structural being coincidental with the longitudinal axis passing through the cone,

(c) the inside wall of said frusto-conical structure being smooth in a longitudinal direction, so as to provide an unhindered path for gases travelling longitudinally along the wall,

(d) means for securing said structure to the shaped charge, and

(e) the inner wall of said structure converging from its large to its small end at a closing angle ranging from about 8°–17° at 1.5 cone diametes stand-off to a closing angle of about 30° at from about 0.9 to 0.4 cone diameters stand-off and arranged so that no portion of a generated jet particulates contacts the inner wall, and the velocity of the generated jet is increased to produce substantially increased penetration in a target material.

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**4,109,577**

## DEVICE FOR BOTTOM UNIT FOR PROJECTILE

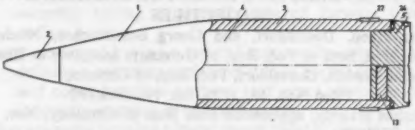
**Nils Gunnar Björkqvist; Hans Arne Edgar Franzén, and Karl Ingmar Wenzel Johansson, all of Karlskoga, Sweden, assignors to AB Bofors, Bofors, Sweden**

**Filed Jun. 21, 1976, Ser. No. 697,899**

**Claims priority, application Sweden, Jul. 4, 1975, 7507705**

**Int. Cl.[2] F42B *4/12***

**U.S. Cl. 102—35.6** **7 Claims**



1. An improved bottom plug for a projectile of the type having a tubular casing defining an interior space closed at its bottom end by said bottom plug, said space enclosing a smoke or illuminating charge and an expulsion charge for forcing said bottom plug and said smoke or illuminating charge from said casing, said bottom plug comprising:

a first part having a substantially cylindrical outer envelope surface portion configured to fit within and close said bottom end of said casing, and an end surface also defining said interior space;

said first part defining a recess extending within said first part and opening only through its said cylindrical envelope surface portion to form an unbroken cylindrical surface for said bottom plug between said recess and said end surface at said first part;

and a second part comprising a centering weight located within said recess, each of said first and second parts being eccentric relative to a central rotational axis of the projectile but jointly forming when said centering weight is in said recess, a substantially centric mass relative to said axis;

whereby said second part is normally maintained within said recess but moves laterally out of the path of said smoke or illuminating charge in response to centrifugal forces when said bottom plug separates from said casing.

**4,109,578**

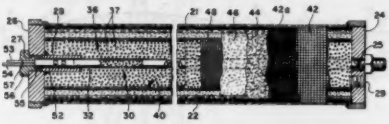
## FLUID GENERATOR

**George W. Goetz, Detroit, Mich., assignor to Eaton Corporation, Cleveland, Ohio**

**Continuation of Ser. No. 591,910, Jun. 30, 1975, abandoned. This application Feb. 17, 1977, Ser. No. 769,749**

**Int. Cl.[2] B60R *21/08***

**U.S. Cl. 102—39** **22 Claims**



1. A device for producing inflating fluid for use with an inflatable occupant restraint in a vehicle, said device comprising:

(a) elongated housing means including means defining a plurality of radial flow fluid discharge ports distributed along substantially the length of said housing means;

(b) gas generating means disposed within said housing means, said generating means including,

(i) booster charge means including a first combustible chemical material;

(ii) elongated casing means disposed within said housing means, and having said booster charge means disposed therewithin and in direct contact with the internal surface thereof, said casing means comprising an elongated tubular member extending substantially the full length of said elongated housing means, said tubular member having the wall thereof thin with respect to the smallest transverse dimension thereof; and formed of frangible material;

(iii) sustaining charge means including a second combustible chemical material capable of producing a compressible fluid upon ignition by said booster charge means, said sustaining charge means being disposed in annular arrangement about said casing means, said second combustible material having a burn rate substantially slower than the burn rate of said first chemical material, said second combustible material being formed of granules which, upon ignition by said booster means, burn so as to form a residue of solid porous sinters, and said annular sustaining means burns to discharge fluid outwardly through said discharge ports;

(c) means within said housing means defining an annular plenum zone communicating with each of said fluid ports, with said plenum zone being disposed about and receiving the fluid discharge from said sustaining charge means;

(d) initiator means disposed adjacent one end of said casing means for igniting said booster charge means, whereupon activation of said initiator means, said booster charge means ignites and progressively ruptures said casing means along the length thereof and progressively longitudinally ignites the portions of said sustaining charge means adjacent said sustaining charge means adjacent said casing means for radially outward burning of said sustaining charge means; and

(e) connector means adapted for connecting said initiator means to a source of activation.

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**4,109,579**

## PRACTICE AMMUNITION DEVICE

**Harry R. Carter, Moscow, Pa., assignor to Carter Pol Development Corp., Moscow, Pa.**

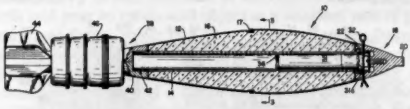
**Filed Oct. 29, 1976, Ser. No. 737,144**

**Int. Cl.[2] F42B *13/22***

**U.S. Cl. 102—41** **10 Claims**

1. A practice shell comprising an outer casing; tubular means mounted coaxially within and spaced from said casing substan-

tially throughout its length; cementitious ballast means substantially filling the space between said casing and tubular means, said cementitious ballast means being of suitable composition so that, when mixed with water, it sets up rapidly between said casing and tubular means, it develops high early strength, and it expands upon setting to substantially completely fill the space between said casing and tubular means; a nose assembly connected to the forward end of said tubular means; a firing pin assembly mounted within said nose assembly; and a signal device mounted within said tubular means and adapted to be detonated by said firing pin assembly upon impact of said nose assembly with a target.



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**4,109,580**

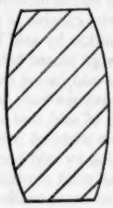
## ARMOR PLATE PENETRATOR

**Patrick J. Devine, Cinnaminson, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Division of Ser. No. 660,526, Feb. 23, 1976, abandoned. This application Mar. 10, 1977, Ser. No. 776,341**

**Int. Cl.[2] F42B *13/06***

**U.S. Cl. 102—52** **1 Claim**



1. In an armor piercing round having a case wall including propellant therewithin and a projectile disposed at a forward portion of said case wall, said projectile including a penetrator or core therewithin, said projectile being carried by a non-discarding sabot, said sabot having a windshield associated therewith, and means for igniting said propellant within said case for propelling said projectile forwardly with said sabot and windshield from said case at a high rotational speed, in combination therewith, the improvement comprising said penetrator or core having a non-circular transverse cross-section and a center of gravity and weight substantially identical with said penetrator or core, said nondiscarding sabot having an internal configuration mating generally with the external configuration of said non-circular transverse cross-section penetrator, a non-circular transverse cross-section penetrator which includes;

a barrel shaped elongated penetrator member having a transverse cross-section having oppositely disposed symetrically shaped convex sides positioned along a major axis of an axis of rotation of said projectile, said barrel shaped elongated penetrator member having greater mass closer to said axis of rotation than mass further removed therefrom, said penetrator member cross-sectional configuration increasing said projectile shatter velocity and improving the gyroscopic stability of said projectile.

**4,109,581**

## PROJECTILE FOR AN INFANTRY RIFLE

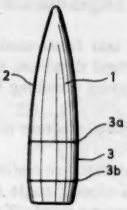
**Ludwig Six, Karlsruhe, Germany, assignor to Mauser-Werke Aktiengesellschaft, Germany**

**Filed May 3, 1971, Ser. No. 140,291**

**Claims priority, application Fed. Rep. of Germany, Aug. 20, 1970, 2041305**

**Int. Cl.[2] F42B *11/26***

**U.S. Cl. 102—92.1** **5 Claims**




1. Projectile, particularly for infantry weapons and light automatic weapons, comprising a small-calibered solid projectile body made of soft iron with an extremely high starting speed, provided with a conical guide portion between its ends whose largest and smallest diameters are each greater than the smallest diameter of the rifling in the barrel of the weapon through which the projectile is intended to travel.

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**4,109,582**

## TWIST-REDUCING RINGS FOR STABILIZED PROJECTILES

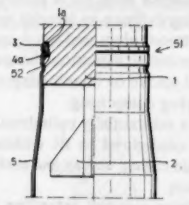
**Heinz Haep, Dusseldorf, and Georg Schumacher, Niederkruechten, both of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Dusseldorf, Fed. Rep. of Germany**

**Filed Nov. 11, 1976, Ser. No. 740,790**

**Claims priority, application Fed. Rep. of Germany, Nov. 15, 1975, 2551389**

**Int. Cl.[2] F42B *31/00***

**U.S. Cl. 102—93** **9 Claims**



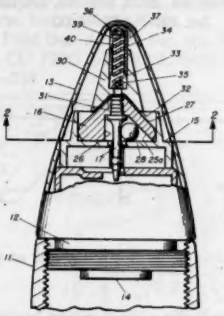

1. In a stabilized projectile having charge-carrying jacket means extending forwardly and separable from an associated cartridge, the jacket means having an annular groove on the outer periphery thereof, and twist-reducing ring means rotatably carried in the annular groove for relative rotation concentric with the axis of the projectile, the improvement wherein the twist-reducing ring means comprises a plurality of identical, axially aligned first ring segments disposed in circumferentially successive abutting relation, the first segments cooperating to form a first closed annulus; and in which the projectile further comprises means for removably retaining the cooperating first segments in the annular groove prior to separation of the jacket means from the cartridge.

4,109,583

## PROJECTILE FUZE

Melvin Eneman, New York, N.Y., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Continuation-in-part of Ser. No. 675,429, Apr. 9, 1976, abandoned. This application Jul. 27, 1977, Ser. No. 819,306
Int. Cl.[2] F42C 15/22
U.S. Cl. 102—244 4 Claims



1. In a point detonating spin stabilized projectile having a tapered forward nose member and a fuze forward housing secured in said nose member,

said fuze forward housing having a central longitudinal passage accommodating a longitudinally movable firing pin, said fuze forward housing having a forwardly opening recess containing a firing pin assembly, said firing pin assembly including said firing pin and an element having a plurality of slotted inclined walls a camming ball adjacent each of said slotted inclined walls, each of said balls being responsive centrifugal force for forwardly camming said firing pin assembly to arm said firing pin, said firing pin assembly having a conically tapered forward external surface portion,

a graze sensor having a tapered rearwardly opening recess defining a camming surface in at least partial contact with said conical surface portion, said graze sensor having a forwardly opening cylindrical recess,

a rearwardly opening tubular sleeve slidably mounted in said cylindrical recess, and

a compression spring in said sleeve for forwardly biasing said sleeve against said nose member.

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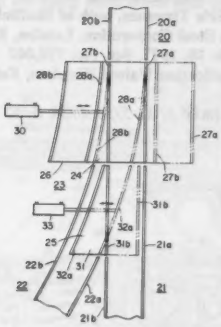
4,109,584

## TRACK SWITCHING DEVICE FOR TWO-RAIL TYPE TRACKS

Kiyoshi Mihirogi, Odawara, Japan, assignor to Japan Airlines Co., Limited, Tokyo, Japan

Filed Dec. 22, 1976, Ser. No. 753,365
Int. Cl.[2] E01B 7/00, 25/12
U.S. Cl. 104—130 4 Claims

1. A track switching device for two-rail type tracks for guiding magnetic floating type rolling stock including drive means with a protruding portion positioned between the two rails of said track, said device comprising first, second and third tracks, first and second movable means, said first movable means having two rails and being positioned at the joint of the first track and the second and third tracks to which said first track is selectively coupled, each of said first, second and third tracks having two parallel rails, said two rails of said first movable means being positioned such that when said first movable means is moved to switch the tracks, said two rails of the first movable means are moved between the two outer rails of said second and third tracks for coupling a selected one of said two rails of the first movable means to a selected one of inner rails of said second and third tracks and for providing sufficient space between said rails for said protruding portion of said vehicle drive means; said second movable means being



positioned between said first track and said first movable means and having track means engageable with said first, second, and third tracks and said first movable means.

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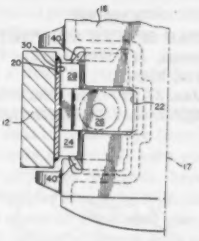
4,109,585

## FRICTIONALLY SNUBBED RAILWAY CAR TRUCK

Albert F. Brose, St. Louis, Mo., assignor to AMSTED Industries Incorporated, Chicago, Ill.

Filed Dec. 23, 1976, Ser. No. 753,789
Int. Cl.[2] B61F 5/06, 5/12, 5/24, 5/50
U.S. Cl. 105—197 DB 8 Claims

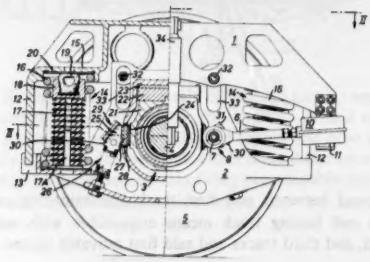


1. A friction apparatus for a railway car truck comprising: a side frame having a substantially upright column partially defining a bolster opening; a bolster resiliently supported in said opening for vertical movement therein; a vertical planar friction surface on said column; guiding surfaces on said bolster; a friction shoe comprising a substantially planar wall, a vertical spring pocket and wings projecting laterally outward from said spring pocket and having guided surfaces; a spring in said spring pocket urging said wings into engagement with said guiding surfaces thereby guiding said wall into engagement with said friction surface; said wing guided surfaces being inclined toward said wall and said guiding surfaces to form an angle with said guiding surfaces having its apex adjacent said spring pocket to tend to rotate said friction shoe about the spring.

## 4,109,586
## UNIVERSALLY SUSPENDED SNUBBING RAILWAY AXLE TRUCK

Alan H. Briggs, and Eric Timmons, both of Sheffield, England, assignors to British Steel Corporation, London, England

Filed Feb. 18, 1977, Ser. No. 770,047
Claims priority, application United Kingdom, Feb. 20, 1976, 6849/76
Int. Cl.² B61F 3/00, 5/36, 5/38, 5/50
U.S. Cl. 105—224 A 10 Claims

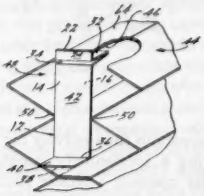


1. A railway wagon suspension unit comprising
a saddle
an axle journal housing accommodated in the saddle, the saddle being mounted for lateral rocking movement relative to the axle journal housing
a frame mounted over the saddle, the frame being vertically moveable relative to the saddle in response to vertical loads applied to the frame,
suspension means disposed between the frame and the saddle and including
load springs for vertical support, and
a friction block mounted on the saddle and firmly biassed against the axle journal housing whereby to provide substantially constant frictional forces against lateral motion between the saddle and the housing independently of vertical loading on the frame.

## 4,109,587
## LOAD SPACER SUPPORT

Bernard George Jansen, Jr., Withamsville, Ohio, assignor to Narad, Inc., Wayne, Mich.

Filed Jan. 27, 1977, Ser. No. 763,043
Int. Cl.² B60P 7/14, 7/16; B61D 45/00, 49/00
U.S. Cl. 105—490 10 Claims

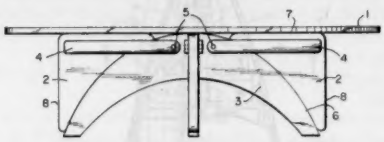


1. A load spacer device comprising:
a multicelled honeycombed collapsible load spacer;
a support means for said load spacer comprising:
a first generally vertical flange portion adapted to be secured to a vertical surface;
a second generally horizontal flange portion spaced from said first flange portion adapted to be supported by a horizontal surface;
a main body portion interconnecting said first vertical and second horizontal flange portions; and
said main body portion being provided with a generally horizontal supporting flange portion secured to said load spacer so as to support said load spacer between opposing spaced apart vertical surfaces.

## 4,109,588
## ADJUSTABLE HEIGHT TABLE

Richard J. Powers, 3622 Milford Mill Rd., Baltimore, Md. 21207

Filed Nov. 11, 1977, Ser. No. 850,635
Int. Cl.² A47B 85/00
U.S. Cl. 108—12 8 Claims

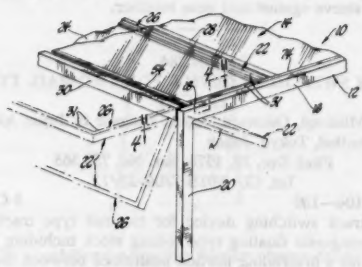


1. A table adjustable between a lower and an upper position which comprises:
a table top;
a plurality of interlocking leg members having a maximum height equal to the table top height at its lower position;
a plurality of table top support members, each of said support members having a first support surface upon which the table top rests when in its lower position and a second support surface disposed at a right angle to said first surface, said table top resting upon said second support surface when in its upper position;
arm members fixedly connected to said support members and pivotally connected to said leg members and adapted to pivot through a 90° arc whereby there is provided support means for said table top in a lower and an upper position.

## 4,109,589
## END LEAF TABLE

Alfred E. Ruckriegel, and David W. Buehler, both of Jasper, Ind., assignors to Winzeler Stamping Company, Montpelier, Ohio

Filed Jul. 7, 1977, Ser. No. 807,945
Int. Cl.² A47B 1/04
U.S. Cl. 108—63 12 Claims



1. A glass top table comprising: a pair of spaced side frames each of which has a longitudinally extending upper frame member with opposite ends and a pair of legs having upper ends connected to the ends of the upper frame member so as to extend downwardly therefrom; a table top of glass extending laterally between the upper frame members of the side frames and longitudinally between the ends thereof; a pair of end leaves each of which includes a frame and a glass leaf supported thereby; a pivotal connection supporting each end leaf frame on the side frames at adjacent ends of the upper frame members thereof for movement therebetween about a horizon-

tal axis between an inwardly extending lower storage position below the glass table top and an outwardly extending upper use position in alignment with the glass table top; and means for positioning the end leaves in either the storage or use positions.

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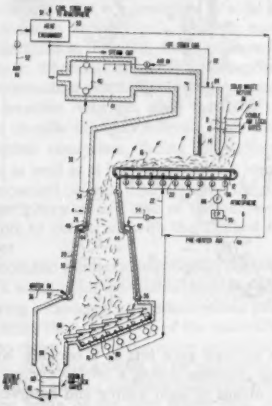
**4,109,590**

## APPARATUS AND METHOD FOR PRODUCING GAS

**Vaughn Mansfield, Gallatin, Tenn., assignor to Mansfield Carbon Products, Inc., Gallatin, Tenn.**

**Filed Dec. 3, 1976, Ser. No. 747,194**
**Int. Cl.² F23G *5/00*; F23L *9/00*; F23J *1/02***
**U.S. Cl. 110—235** **5 Claims**



1. In combination,
a horizontal chain grate furnace having
input and output ends,
means for feeding solid municipal refuse onto the chain grate at the input end,
means for spreading said material onto said chain grate to form a bed thereon,
zoned airbox means beneath the grate for supplying air in controlled amounts to the material in the bed,
a vertical shaft furnace having an upper end connected to the output end of the horizontal furnace and a lower end,
an incremental feeder for discharging sterile ash residue from the lower end of the shaft furnace,
means for supplying controlled amounts of air into the shaft furnace at a plurality of spaced locations between the upper and lower ends thereof, and
means for exhausting gases from said furnaces.

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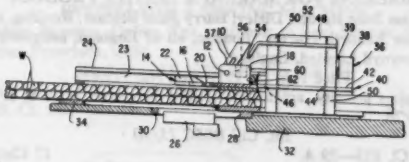
**4,109,591**

## BUTTONHOLE SEWING PRESSER DEVICE WITH INTERLOCK FINGER

**Joseph G. Rakacs, Toms River, N.J., assignor to The Singer Company, New York, N.Y.**

**Filed Aug. 29, 1977, Ser. No. 828,354**
**Int. Cl.² D05B *3/24***
**U.S. Cl. 112—76** **3 Claims**

1. A buttonhole sewing presser device of the type having a presser foot adapted to be secured to a vertically shiftable sewing machine presser bar, a traveling shoe positionable upon work fabrics being stitched and slidably engaged on the presser foot, a work engaging plate positionable under the work fabrics being stitched, and means interconnecting said work engaging plate and said traveling shoe insuring sliding movement of said work engaging plate together with said travelling shoe relatively to said presser foot with capacity for movement of said traveling shoe toward and away from said work engaging plate when said presser foot is lowered and raised, the improvement which comprises interengagable interlock elements carried on said presser foot and on said work engaging plate, said interlock elements being shiftable out of engagement so as to free said traveling shoe when said presser foot is lowered,



and into engagement so as to prevent sliding movement of said traveling shoe relatively to said presser foot when said presser foot is raised.

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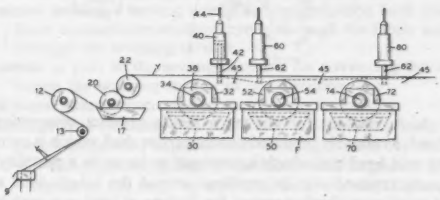
**4,109,592**

## MENDING YARN IN THE SELVEDGE OF TUFTED CARPETING

**Clifford Aldene Bryant, Dalton, Ga., assignor to West Point-Pepperell, Inc., West Point, Ga.**

**Filed Nov. 29, 1976, Ser. No. 745,974**
**Int. Cl.² D05C *15/34***
**U.S. Cl. 112—79 A** **20 Claims**



1. Apparatus for dyeing yarn ends individually at predetermined positions along their lengths and manufacturing tufted carpeting therefrom to produce a predetermined multi-colored complex pattern therein comprising a series of troughs for different dye baths,
means feeding a sheet of yarn ends from a supply to said baths in succession,
dyeing means associated with each trough to cause segments of said yarn ends to receive dye from each trough,
a plurality of banks of movable yarn guides for individual yarn ends or groups of yarn ends, there being at least one bank of yarn guides associated with each dyeing means,
pattern control means to move each yarn guide individually to cause yarn carried by it to be dyed segmentally while a predetermined length of yarn passes,
in combination with means feeding a group of mending yarn ends from said supply along a side of said sheet,
means feeding said group of mending yarn ends over said baths,
movable yarn guide means for at least one yarn end of said mending group, there being at least one mending yarn guide means associated wth each bath,
and control means to cause said mending-yarn-guide means to move the yarn ends of said mending group and to cause them to be dyed segmentally while a predetermined length of yarn passes,
and means to conduct said yarn sheet and said group mending yarn ends to a tufting machine, and
a tufting machine having needles in which the individual yarn ends of said yarn sheet and said mending yarns are threaded, and by which the yarn ends are needled through

a backing sheet to produce carpeting with the predetermined pattern.

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**4,109,593**

## MACHINE FOR MAKING A TEXTILE PRODUCT

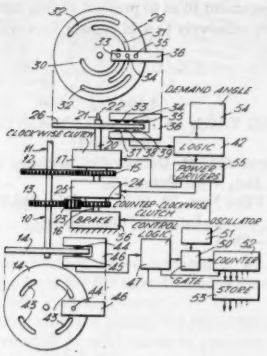
**William John Barnes, Disley; Barry John Belcher, Reading, and John Kenneth Harvey, London, all of England, assignors to Newroyd Limited, England**

**Filed Feb. 28, 1977, Ser. No. 772,839**

**Claims priority, application United Kingdom, Mar. 4, 1976, 8752/76**

**Int. Cl.[2] D05C *15/30***

**U.S. Cl. 112—79 A** **17 Claims**




1. A machine for making a textile product comprising a head, a rotatably mounted needle carrier shaft which is carried by said head and which is arranged to be set in a plurality of predetermined angular positions around the longitudinal axis thereof, yarn feeding means for feeding at least one yarn to a needle carried by said shaft, a first motor for driving the yarn feeding means, reciprocating means for reciprocating the said needle carrier shaft so that the said yarn may be applied to a base material, second and third motors for respectively traversing said head in two orthogonal linear directions over the base material, and programmed control means which ensure at all times during production that a needle carried by the needle carrier shaft always faces forwardly with respect to the direction of movement of the head, the control means being controlled in dependence upon the speed of reciprocation of the needle carrier shaft, and the control means controlling the operation of the first, second and third motors in dependence both on said program and on said speed of reciprocation.

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**4,109,594**

## TUFTING MACHINE MALFUNCTION DETECTION DEVICE

**Abram N. Spanel, 344 Stockton St., Princeton, N.J. 08540; P. Frank Eiland, Stamford, Conn.; David R. Jacobs, New Canaan, Conn., and Geza C. Ziegler, Stamford, Conn., assignors to Abram N. Spanel, Princeton, N.J.**

**Filed Jun. 30, 1977, Ser. No. 811,968**

**Int. Cl.[2] D05C *15/16***

**U.S. Cl. 112—79 R** **19 Claims**

1. A method of tufting wherein the improvement comprises an improved method of detecting malfunctions, said method of tufting comprising the steps of:

pneumatically transporting yarn strands to a loading station with respect to yarn bit-applying elements;

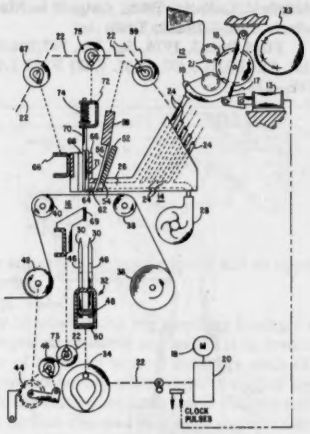
severing said yarn strands to form yarn bits;

applying the yarn bits to a backing layer with said bit-applying elements; and,

utilizing a light detection system within said loading station to detect the presence of yarn after the tufting cycle, which presence of yarn indicates a malfunction.

7. A method of tufting wherein the improvement comprises utilizing an improved malfunction detection system comprising the steps of:

providing severed yarn bits in a loaded position with respect to bit-applying elements at tufting stations;




applying the severed yarn bits to a backing layer by said bit-applying elements during a tufting cycle;

searching by means of light source and receiver means for any yarn in the tufting stations after the tufting cycle is completed, the detection of such yarn indicating a machine malfunction; and

signalling a malfunction when such yarn is detected.

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**4,109,595**

## MULTIDIFFERENTIAL DEVICE

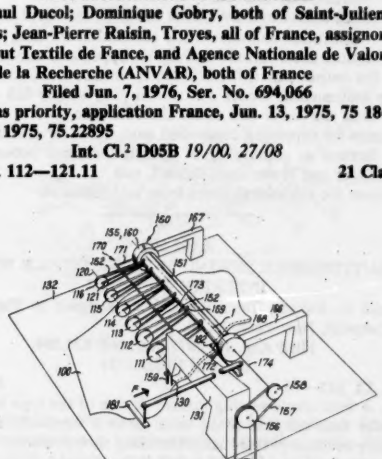
**Jean-Paul Ducol; Dominique Gobry, both of Saint-Julien les Villas; Jean-Pierre Raisin, Troyes, all of France, assignors to Institut Textile de Fance, and Agence Nationale de Valorisation de la Recherche (ANVAR), both of France**

**Filed Jun. 7, 1976, Ser. No. 694,066**

**Claims priority, application France, Jun. 13, 1975, 75 18648; Jul. 22, 1975, 75.22895**

**Int. Cl.[2] D05B *19/00, 27/08***

**U.S. Cl. 112—121.11** **21 Claims**



1. A multidifferential device of the type comprising a plurality of differentials, whereby each comprises a differential holder with at least two epicyclic gears and two planetary gears and in which the imaginary rotation axis of all the differential holders and planetary gears is the same, whereby the

differential holders and planetary gears are designed as rotary members whereof two serve as input members and one serves as the output member and which comprise two end members and, between them, a plurality of intermediate members in which an end input or output member is constituted as a planetary gear, whereby the epicyclic gears of every other intermediate differential holder member is located at the same radial level relative to said rotation axis, in which a plurality of intermediate differential holder members each comprises an external or internal planetary gear path on both of its faces and at least one inner or outer epicyclic gear and in which each end member comprises a planetary gear, wherein it comprises at least two output members, wherein each of the members can be an input member or an output member, wherein all the members idle in rotation but are immobile in axial displacement of the same common support axis wherein each intermediate member constitutes at the same time a differential holder and a planetary gear, wherein each member comprises in its peripheral area a connecting member able to cooperate with a driving or driven member, wherein each input or output member comprises a circular disc and wherein each disc of an input or output member comprises, facing the adjacent member a toothed rim as well as at least one epicyclic gear wheel on the one hand mounted on said disc between the toothed rim and either the periphery of said disc or the common shaft and on the other able to cooperate with the toothed rim of the adjacent member.

8. An automatic guidance installation for placing an article in front of a work point associated with the implacement of a tool, following a random but predetermined path, said installation constituting the application of the multidifferential device according to claim 1 and being more particularly intended for the guidance of textile articles to be assembled by sewing and associated with a sewing machine equipped with a work table, said machine being of the type comprising, in addition to a work area, a rectilinear member able to impart to that portion of the article located adjacent the work point a translational movement in accordance with a predetermined direction; a detecting means provided upstream of the work point for determining the position of a portion of the edge of the article relative to the work point; a drive mechanism which is able to come into contact with the article at a plurality of points located on a straight line passing through said work point and perpendicular to the drive direction of the rectilinear drive member, and being operable to impart to the said article in the area of the contact points a pivotal movement about a point located on said straight line and constituting a momentary center of curvature of a portion of a curve passing at the considered moment through the work point and associated with said article; the drive mechanism further comprising a plurality of drive rollers, a main drive motor, a reversible auxiliary motor controlled by the detecting means and a differential, one input of which is mechanically connected to the main drive motor and the other input of which is mechanically connected to the auxiliary motor; the output of said differential controlling one of the drive rollers; the guidance installation further comprising, in the drive mechanism, a plurality of equal diameter pressure and drive rollers arranged above the work table, mounted so as to idle in rotation and at equal distance from one another on a common shaft whose vertical projection coincides with a straight line which is perpendicular to the direction of the translational movement imparted on the article by the rectilinear drive member and which passes through the work point; a multidifferential device equipped with a plurality of output members each connected kinematically to one of said rollers and two input members; a reversing device placed between the main motor and the second input member of the multidifferential device; a single auxiliary differential having one planetary gear input thereof cooperating with the output of the reversing device and the planetary gear output cooperating with the second input member of the multidifferential device; the differential holder input thereof cooperating with the output of the reversible auxiliary motor; and the input member which is connected to the main drive motor being located at least approximately in the same vertical plane as the said rectilinear drive member.

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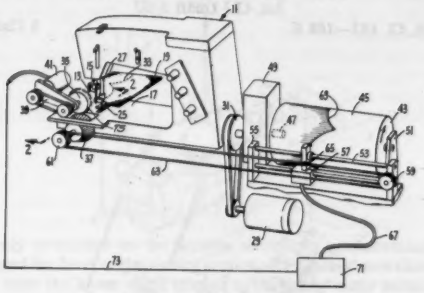
**4,109,596**

## AUTOMATIC STITCHING PATTERN CONTROL SYSTEM FOR A SEWING MACHINE

**Hubert Blessing, Dallas, Tex., assignor to Levi Strauss & Co., San Francisco, Calif.**

**Filed Jun. 23, 1977, Ser. No. 809,305**
**Int. Cl.[2] D05B *19/00***
**U.S. Cl. 112—121.11** **8 Claims**



1. For a sewing machine of the type including:
a working surface adapted to carry fabric being sewn,
means holding a sewing needle for reciprocation back and forth in repetitive stitching cycles through the fabric and through the working surface,
means as part of the sewing machine for advancing fabric across the working surface in one direction, and
a motor source connected to reciprocate the needle,
an improved stitching pattern control system, comprising:
means positioned adjacent said working surface for controlling the orientation of the fabric with respect to the needle as the fabric is advanced over the working surface, thereby to change the direction of stitching being placed on the fabric,
means provided adjacent said work surface for mechanically sensing by contact with the fabric any such change of direction,
pattern means driven in synchronism with said needle from said motor source but independent of the fabric itself for setting the desired direction of stitching the fabric as a function of the fabric position with respect to the needle along said one direction, and
means continuously receiving said desired fabric stitching direction setting and receiving an indication of the actual fabric stitching direction from said mechanical sensing means for automatically causing said fabric orientation controlling means to change the orientation of the fabric with respect to said needle as it is advanced in said one direction in a manner to equalize the desired and actual direction, whereby the stitching direction settings of the pattern means control the stitching pattern of the fabric.

8. An automated fabric guide device for a sewing machine of the type having a reciprocating sewing needle and a work surface for supporting the fabric as it is advanced under the reciprocating needle, the fabric guide device comprising a rotatable guide wheel fixedly mounted ahead of the needle with respect to the direction of fabric advancement through the sewing machine, the guide wheel bearing against one surface of the fabric and being rotatable about an axis which is non-parallel to the direction of fabric advancement, a detectable pattern having a stitch line thereon, detector means adjacent the stitch line pattern for monitoring a portion of the pattern and for producing a control signal representative of changes in the relative positions of the stitch line pattern and the detector means, servo motor means for rotating the guide

wheel in response to the control signal, and means, including the guide wheel, for effecting controlled relative movement between the stitch line pattern and the detector means in synchronism with movement of the fabric relative to the work surface so as to maintain the detector means centered over the stitch line of the pattern.

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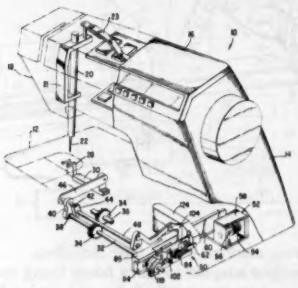
**4,109,597**

## ELECTRO-MECHANICAL ACTUATOR

**Kenneth D. Adams, Madison, N.J., assignor to The Singer Company, New York, N.Y.**

**Filed Aug. 31, 1977, Ser. No. 829,405**
**Int. Cl.[2] D05B *3/02***
**U.S. Cl. 112—158 E** **4 Claims**



1. In a sewing machine having a drive shaft, stitch forming instrumentalities which includes a variable feed mechanism, a feed shaft driven by said drive shaft, and means for generating a low level variable electrical signal corresponding to desired positions of said stitch forming instrumentalities, an electro-mechanical actuator comprising:

a movable block having a pair of coplanar inclined surfaces opening on opposite sides thereof;

means for intermittently positioning said block in response to said electrical signal;

a pair of adjacent limbs having opposing feelers for closing upon said inclined surfaces, said limbs being pivotally mounted such that the angular positioning of said limbs will vary dependent on the position of said block;

means for closing and opening said limbs alternately to operation of said positioning means; and,

means cooperating with said limbs for transferring the movement of said limbs derived from the varying angular position thereof, to said stitch forming instrumentality.

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**4,109,598**

## METHOD OF MAKING A UNITARY FRAME FOR A WINCH

**Robert C. Kucher, 5200 Airport Way South, Seattle, Wash. 98108, and Terence W. Dahl, 6117-183rd Pl. Southwest, Lynnwood, Wash. 98036**

**Division of Ser. No. 251,218, May 8, 1972, abandoned. This application Jun. 23, 1975, Ser. No. 589,588**
**Int. Cl.[2] B21D *53/00***
**U.S. Cl. 113—116 HH** **4 Claims**

1. A method for making a frame for an apparatus, said frame comprising:

a. a base;

b. a first side;

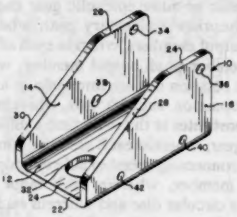
c. a second side;

d. said first and said second sides projecting outwardly from said base;

e. said frame being a unitary structure and of a thickness of at least 3/16 inch;

f. said method comprising forming a piece of metal to have a ridge, a first outer surface, a second outer surface, a first inner surface and a second inner surface, and in an elevation view presenting a configuration of a V-shaped piece of metal;

g. working said V-shaped piece of metal to form the outer part of said first outer surface to be adjacent the inner part of said first outer surface, and to form the outer part of said second outer surface to be adjacent the inner part of said second outer surface, and in an elevation view presenting a configuration of a W-shaped piece of metal; and,



h. working said W-shaped piece of metal to, substantially, remove said ridge with the inner part of said first outer surface and inner part of said second outer surface being, substantially, a continuous surface and defined as a base and, said first outer surface becoming the surface of said first side and said second outer surface becoming the surface of said second side.

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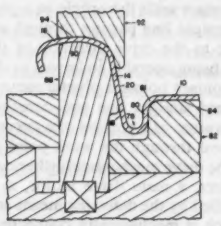
**4,109,599**

## METHOD OF FORMING A PRESSURE RESISTANT END SHELL FOR A CONTAINER

**Freddy R. Schultz, Lower Burrell, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.**

**Filed Nov. 4, 1977, Ser. No. 848,517**
**Int. Cl.[2] B21D *51/44***
**U.S. Cl. 113—121 C** **14 Claims**



1. A method of forming a pressure resistant end shell for a container comprising the steps of:

providing a sheet metal end shell having interior and exterior surfaces respecting its intended use on a container, a central wall portion in the end shell, a frustoconical wall portion around the central wall portion projecting upwardly and outwardly with respect to the exterior surface of the central wall portion, and a radially outwardly projecting peripheral flange around the outer edge of the frustoconical wall portion;

supporting the central wall portion with a first supporting means disposed against the interior surface thereof opposite said frustoconical wall portion substantially concentrically of the end shell to within less than approximately 97.5% of the diameter of the central wall portion;

supporting the peripheral flange with a second supporting means disposed against at least a portion of the exterior surface thereof; and

reducing the distance between the peripheral flange and the

central wall portion by moving at least one of the supporting means toward the other to form the outer peripheral portion of the central wall portion downwardly and inwardly toward the first supporting means into the shape of a reinforcing channel around the central wall portion.

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**4,109,600**

## PROCESS FOR APPLYING A THREADED SEAT IN A METAL PLATE

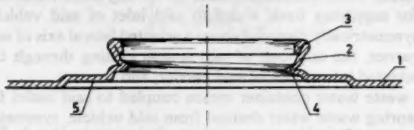
**Willem Pieter Post, Burg.Arriensweg 7, Diepenveen, Netherlands**

**Filed Dec. 11, 1975, Ser. No. 639,924**

**Claims priority, application Netherlands, Nov. 13, 1975, 7513282**

**Int. Cl.² B21D *51/00***

**U.S. Cl. 113—121 R** **3 Claims**




1. A process for providing an internally threaded seat on a metal plate, such as the wall of a drum, comprising the steps of:

making a hole in the plate;

drawing a generally cylindrical collar from the plate periphery around said hole approximately at a right angle to the plane of the plate, said cylindrical collar having at the conclusion of said drawing step an internally directed annular disc at the outer end thereof and a single screwline formed in its base by said drawing step and extending upwardly from a beginning point in the plane of said plate over the lower portion of the height of said collar, said drawing further providing a widening at the base of said collar in the area of said beginning point and of sufficient width and height to include both the beginning and the end of said single screwline;

bending said annular disc inwardly to form a continuous flange about the outer end of said collar; and

pressing axially on the opposite ends of said collar whereby the portion thereof between said continuous flange and said plate carrying said formed single screwline is deformed inwardly to form a thread.

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**4,109,601**

## VESSEL FOR WORKING UNDER WATER

**Carl M. Ronnevig, Haugesund, Norway, assignor to Skipsaksjeselskapet Suderoy, Haugesund, Norway**

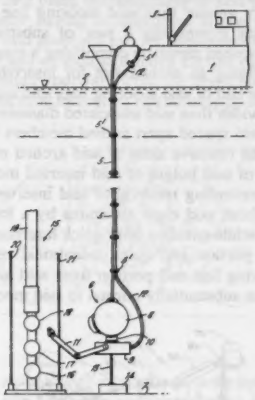
**Filed Dec. 1, 1976, Ser. No. 746,541**

**Claims priority, application Norway, Dec. 8, 1975, 754144**

**Int. Cl.² B63G *8/00***

**U.S. Cl. 114—314** **7 Claims**

1. In a vessel for working under water at any level from the lower water bottom to the upper water surface, the vessel having a service section carrying working tool devices thereon and propulsion means, and a residence chamber detachably mounted on said service section, the residence chamber having an atmospheric pressure therein and including monitoring means therein for controlling the working tool devices; the improvement comprising that the residence chamber has a substantially spherical shape with an outer smooth surface free from protruding elements, the residence chamber being connected to a carrier vessel on the water surface thereof by a hoisting wire, whereby in case the protruding working devices of the service section are hooked or wedged during an underwater operation, the spherical smooth residence chamber can be detached from the service section and hoisted to the carrier vessel, with said working tool devices of the service section being so mounted thereon to permit detachment of the residence chamber and provide an escape path for the substantially spherical residence chamber during the hoisting operation and wherein the vessel includes controllable buoyancy means operatively connected to the service section to predeterminely control the level of the service section and the residence chamber from the lower water bottom to the upper water surface.



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**4,109,602**

## HAWSER HOOK

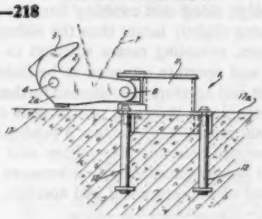
**Siegfried Voss, Bremerhaven-W., Fed. Rep. of Germany, assignor to Aktien-Gesellschaft "Weser", Bremen, Fed. Rep. of Germany**

**Filed Dec. 21, 1976, Ser. No. 752,846**

**Claims priority, application Fed. Rep. of Germany, Dec. 24, 1975, 2558746**

**Int. Cl.² B63B *21/04***

**U.S. Cl. 114—218** **10 Claims**



1. A hawser hook, particularly for use in mooring ships to piers and similar mooring structures, comprising an anchoring element rigidly connected to a respective mooring structure and projecting from an exposed surface of the latter; a hook element having a mounting portion and a free portion spaced from said mounting portion; means for mounting said hook element on said anchoring element for movement at least toward and away from the exposed surface; and means for so supporting said hook element that the same is suspended from said anchoring element immediately adjacent and with spacing from the exposed surface when no external force is applied thereto while said free portion thereof abuts the exposed surface upon loading thereof.

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**4,109,603**

## BOAT MOORING APPARATUS

**Stephen Franklin Guthmann, 1 Brandon Rd., DeWitt, N.Y. 13214**

**Filed Oct. 20, 1976, Ser. No. 734,290**

**Int. Cl.² B63B *21/00***

**U.S. Cl. 114—230** **18 Claims**

10. A boat mooring cleat apparatus for enabling quick releas-

able mooring of a boat to a mooring post means by a mooring line having an associated diameter and a plurality of longitudinally spaced apart bulges therealong, said bulges having associated diameters greater than said mooring line diameter, said cleat apparatus comprising a pair of substantially parallel spaced apart arched members comprising a convex and a concave side defining an arched slot for insertably receiving a portion of one end of said mooring line, said arched slot being narrower in width than said associated diameter of any one of said bulges, said spaced apart arched members defining a stop member on the concave sides of said arched members for an adjacent one of said bulges of said inserted mooring line end portion for preventing removal of said inserted mooring line end portion from said cleat apparatus by a force along said mooring line while enabling both quick insertion of said mooring line end portion and quick intentional removal of said inserted mooring line end portion from said arched slot by a sufficient force substantially normal to said mooring line, each

pair of ends of said arched members being in transverse registration, means to interconnect each pair of ends and to mount each said interconnected pair of ends on a support, said arched members being configured to extend away from the support adjacent to each pair of ends and thereafter to extend along and spaced from said support, both arched members being configured to extend back to the support, said spaced apart arched members also defining an aperture, which aperture is spaced away from the longitudinal center of said arched members, for insertion of a bulge along said mooring line, the diameter of said aperture being slightly larger than the associated diameters of said bulges, mounting means adjacent to said pair of ends closest to said aperture intended to be fastened to said support such that said aperture is positioned further away from said mooring post means than said pair of ends remote from said aperture, said arched slot enabling a predetermined slippage of said inserted mooring line within said arched slot dependent upon the longitudinal extent between the pair of ends remote from said aperture and said aperture.

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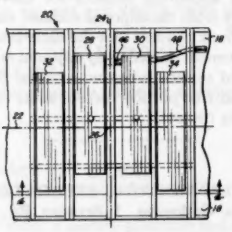
**4,109,604**

## FRESH WATER SUPPLY AND WASTE WATER RETENTION SYSTEM

**Richard E. Reed, Scottsdale, Ariz., assignor to CAF Industries, Phoenix, Ariz.**

**Filed May 31, 1977, Ser. No. 801,619**
**Int. Cl.² B63B *35/00***
**U.S. Cl. 114—270** **16 Claims**



1. In a floating carrier for transporting land based recreational vehicles on a body of water, said carrier including

(a) float means for bouyantly supporting said carrier above the water, said carrier having a center of gravity; and
(b) a deck disposed above and coupled to said float means for supporting said vehicle;

said vehicle including

(a) an inlet for receiving fresh water into said vehicle;
(b) an outlet for draining waste water from said vehicle; and
(c) means for controlling the flow of fresh water within said vehicle;

a fresh water supply and waste water retention system having a midpoint and forming a part of said carrier for maintaining the center of gravity of said system substantially constant as fresh water is supplied to said vehicle and waste water is received from said vehicle, said system comprising in combination:

(a) fresh water container means for storing fresh water and for supplying fresh water to said inlet of said vehicle, symmetrically disposed about a selected lateral axis of said carrier, the midpoint of said system passing through the selected lateral axis of said carrier; and
(b) waste water container means coupled to said outlet for storing waste water drained from said vehicle, symmetrically disposed about the selected lateral axis of said carrier;

whereby drawing fresh water from said fresh water container means and draining waste water into said waste water container means will have substantially no effect on the center of gravity of said system or the center of gravity of said carrier/-vehicle combination.

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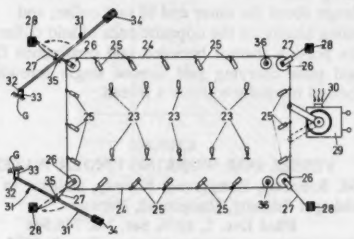
**4,109,605**

## SCARECROW SYSTEM

**Emil Bächli, Haupstrasse 156, CH-5304 Endingen/AG., Switzerland**

**Filed Apr. 21, 1977, Ser. No. 789,506**
**Claims priority, application Switzerland, Aug. 18, 1976, 010497/76**
**Int. Cl.² G08B *13/00*; G09F *19/12***
**U.S. Cl. 116—22 A** **17 Claims**



1. A scarecrow system for the protection of plants in horticultural plots and fields against predatory attack by animals, especially bird flocks, which comprises:

a main tow line (**24**) and scarecrow devices (**25**) attached thereto;

support means (**26, 27, 28, 31'**) to support said main tow line in a circuitous path amongst the plants (**23**) to be protected against animal attack;

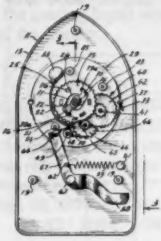
drive means (**29, 30**) attached to said main said main line (**24**) for linearly moving saidmain tow line; and

movable auxiliary scarecrow devices (**31, 34**) operably connected to at least some of said support means (**26, 27**) and actuated upon movement of said main tow line, said auxiliary scarecrow devices (**31, 34**) being secured to a fixed position (G) and actuated by said main tow line (**24**) to move rotatingly from a rest position in arcuate motion perpendicular with respect to the path of the main tow line upon movement of said tow line (**24**).

## 4,109,606
## SELF-ENERGIZED ALARM DEVICE

Clarence W. Jorgensen, deceased, late of Gurnee, Ill., and by Elva Mae Jorgensen, executrix, 5023 Darlene Dr., Gurnee, Ill. 60031

Filed Jun. 29, 1977, Ser. No. 811,895
Int. Cl.[2] G08B 3/02
U.S. Cl. 116—94 10 Claims



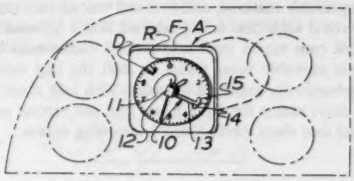
1. A self-energized alarm device operable between a movable and a stationary member comprising:
means defining a housing member for mounting on said movable or on said stationary member;
anchor means for mounting on said movable or said stationary member opposite said housing member;
contact means movable carried by said housing member;
linkage means connecting said contact means with said anchor means;
an alarm member carried by said housing, said alarm member including:
biasing means;
means to activate said biasing means;
means to maintain said biasing means under tension and to release said tension on said biasing means;
a striker arm member;
means to operatively connect said striker arm member with said biasing means to effect a reciprocating movement of said striker arm member upon release of said tension of said biasing means;
a sound producing element carried by said housing member and constructed and arranged to be contacted by said striker arm member;
said means to maintain said biasing means under tension and to release said tension including an actuating element having a portion positioned for temporarily interfering relation with respect to said contact means, so that when a predetermined tension is placed on said linkage means, said contact means contacts said portion of said actuating element to release said tension on said biasing means and activate said striker arm member to contact said sound producing element.

## 4,109,607
## REFERENCE INDEX FOR INSTRUMENT DIALS

Charles Donovan Summers, 1259 Yellowwood Dr., Columbus, Ohio 43229

Filed Jan. 27, 1977, Ser. No. 759,439
Int. Cl.[2] G01L 7/14; G09F 9/00
U.S. Cl. 116—129 A 17 Claims

1. A reference index for dial-type instruments with a face having a circular indicia ring comprising
a mounting pivot including a base plate and an elongated pivot pin having a longitudinally extending pivot pin axis, said pivot pin secured to said base plate in perpendicular relationship thereto, said base plate adapted to be rigidly affixed to the face of the instrument in coaxially positioning the pivot pin relative to the indicia ring for projection outwardly from the instrument's face,
a mounting block positionable on said mounting pivot in retained relationship and selectively revolvable about said pivot pin axis,
an indicator carried by said mounting block for revolution therewith in a plane perpendicular to said pivot pin axis, said indicator having an elongated arm projecting ransversely to said pivot pin axis for movement in the plane of revolution and an indicator index carried by said arm at a position radially outward from the pivot pin axis so as to be in cooperative indicating relationship to the indicia ring

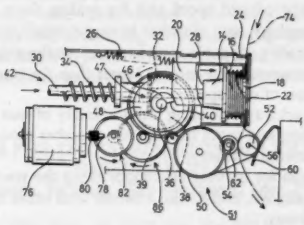



when said mounting pivot is affixed to the instrument, said elongated arm having an end journalled in said mounting block to enable revolution of the arm about a longitudinally extending axis of the arm, said indicator index including at least one reference tab of plate form extending transversely to said arm, said tab positionable in either parallel or perpendicular relationship to the instrument's face in accordance with selective revolution of said arm about its longitudinally extending axis.

## 4,109,608
## SOUND PRODUCING DEVICE

Shigeo Horikawa, No. 1-15-3, Taihei, Sumida-ku, Tokyo, Japan

Filed Jun. 17, 1977, Ser. No. 807,677
Claims priority, application Japan, Mar. 22, 1977, 52-31380
Int. Cl.[2] A63H 5/04; G10K 10/10
U.S. Cl. 116—137 R 10 Claims



1. A sound producing device comprising:
a frame having an opening at one end thereof;
a hermetically sealable cylindrical bag member including a bellows section that is extensible and compressible axially of said frame, said bag member being mounted on said frame for movement relative thereto and having at one end of the bag member an opening coaxial with the opening in said frame;
means for feeding and positioning a sheet of rupturable material between the openings in said frame and bag members for blocking the opening in said bag member;
a pushing and force developing assembly mounted within said frame including a push rod connected to said bag member and extending coaxially with the opening therein, spring means connected operatively between said frame and said push rod and first cam means adapted to urge said push rod against the bias of said spring means and to thereby extend the bellows section of said bag member and at the desired time to release said push rod for move-

ment in the opposite direction under the influence of the force developed by said spring means and to thereby compress said bellows section;

a movable inner frame carried within said frame, said movable inner frame enclosing said bag member and connected thereto adjacent the opening in said bag member;

second cam means engageable with said movable inner frame and adapted to urge same and said bag member in a first direction such that said bag member is hermetically sealed by closing of the opening therein by said sheet of rupturable material, said first and second cam means being formed such that said push rod is not releasable by said first cam means until said second cam means has urged said movable inner frame to shift the bag member into hermetically sealed relationship with said sheet;

and drive means for driving said first and second cam means and said sheet feeding and positioning means.

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**4,109,609**

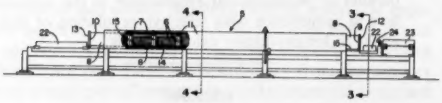
## VACUUM-PRESSURIZED IMMERSION COATER

**Edward E. Hunter, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed May 3, 1976, Ser. No. 682,710**

**Int. Cl.² B05C *3/10***

**U.S. Cl. 118—50** **3 Claims**



1. An apparatus for coating a continuous element, such as a wire tire cord while in the wound condition on a spool, comprising:

(a) at least one elongated chamber having openings at opposing ends, cover plate members at said ends to permit the passage of said spool and for sealing from the ambient atmosphere, said chamber having a length to accomodate a plurality of spools in end-to-end relationship and having a transverse cross section larger than the transverse cross section of said spool;

(b) a trackway extending longitudinally of said chamber for guiding said spool through the chamber along a generally horizontal pathway;

(c) means for moving said spool along the trackway in axially aligned, end-to-end relation with other spools on the trackway;

(d) means for circulating liquid coating to the chamber;

(e) means for creating at least a partial vacuum in the chamber;

(f) means coacting with the vacuum creating means (e) for alternately creating fluid pressure in the chamber;

(g) said means for moving includes a cylinder disposed exteriorly of the pipe adjacent said opening in the pipe through which the spools pass into the chamber, a piston reciprocable within the cylinder, and means connected to the piston and disposed exteriorly of the cylinder for engaging said spool and moving it into the pipe when one of said cover plate members is removed from said opening;

(h) means disposed adjacent each of the opposing ends of the pipe for supporting at least one spool; and

(i) means for mounting the spool support means (h) for movement to and from said adjacent opposing ends of the pipe and in cooperative relationship with said means for moving (c); whereby the spools are positioned for entry into the mouth of the pipe and caught at the exit the pipe.

**4,109,610**

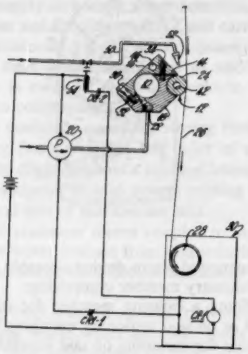
## TEXTILE SIZE APPLICATOR WITH A TEMPERATURE CONTROLLING FLUID

**Kantilal R. Parbhoo, Reynoldsburg; Jerome P. Klink, Granville; John P. Calland, Pataskala, and Gerald L. White, Newark, all of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Filed Dec. 20, 1976, Ser. No. 752,368**

**Int. Cl.² B05C *1/04***

**U.S. Cl. 118—202** **5 Claims**



1. Apparatus for applying a size to a strand comprising:

(a) a reservoir for storing said size;

(b) an applicator member having a surface upon which said strand contacts said size, said applicator member being a non-rotational member;

(c) conduit means adapted to deliver said size from said reservoir to the applicator surface as a film, said conduit means being defined by the opening of two opposed block members, and the configuration of said conduit means being alterable by altering the distance between said two opposed block members; and,

(d) a passageway in each of said block members for the passage of a temperature-controlling fluid, said passageways being connected in series.

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**4,109,611**

## COATING DEVICE

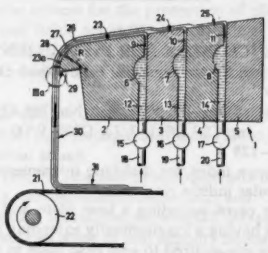
**Fritz Fahrni, Islikon, and Anton Zimmermann, Montagny-la-Ville, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland**

**Filed Mar. 9, 1977, Ser. No. 775,922**

**Claims priority, application Switzerland, Mar. 30, 1976, 3955/76**

**Int. Cl.² B05C *5/00***

**U.S. Cl. 118—325** **10 Claims**



1. A device for coating a travelling web of material with a coating liquid, said device comprising:

means for transporting a web along a path of travel; and

a coating hopper positioned above said path of travel and extending substantially at right angles thereto, said hopper including a pouring lip, said coating hopper having at least one slide surface for producing a liquid curtain which falls freely onto the web to be coated, said pouring lip having a first rectilinear sharp edge with a radius of curvature not exceeding 0.1 mm, said sharp edge being spaced by a distance of from 0.7 to 2.5 mm from an imaginary vertical plane which is tangent to a first boundary surface of said pouring lip, on the coating liquid side thereof, in the operative position of the hopper.

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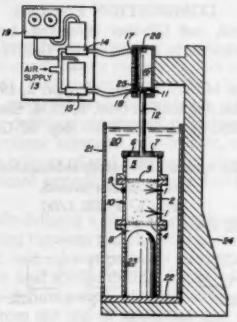
**4,109,612**

## ELECTROLESS PLATING APPARATUS FOR DISCRETE MICROSIZED PARTICLES

**Anton Mayer, Los Alamos, N. Mex., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Sep. 16, 1975, Ser. No. 613,849**
**Int. Cl.² B05C *3/04***
**U.S. Cl. 118—417** **1 Claim**



1. Apparatus for electroless plating discrete, microsized particles with a uniformly thick coating of a material which may be deposited by electroless techniques which comprises:
(a) means for containing a solution of a material useful for electroless plating,
(b) the solution contained in said containment means,
(c) particle containment means submerged within said solution for containing a plurality of said discrete, microsized particles, said means for containing said particles having first and second screened openings opposed therein with the interstices of said screened openings of a size which permits free flow of solution therethrough but which does not permit the passage of said discrete, microsized particles therethrough, said particle containment means comprising a first hollow cylinder with said first and second screens at the ends thereof, and
(d) motor means for establishing a reciprocating motion of said particle containment means within said solution, said reciprocating motion being substantially along the axis of said opposed screened openings in said first hollow cylinder, wherein said motor means is connected to one end of a reciprocating drive means, said reciprocating drive means being connected at its other end to a second hollow cylinder, said second hollow cylinder being joined to one screened end of said first hollow cylinder and of substantially the same diameter as said first hollow cylinder, and
(e) piston and cylinder means axially aligned with said first and second hollow cylinders for forcing said solution from within said cylinder means and into said first hollow cylinder when said hollow cylinder is moving toward said piston means and for creating a suction within said cylinder means and drawing solution thereto from within said first hollow cylinder when said first hollow cylinder is moving away from said piston means, said cylinder means being attached to the other screened end of said first hollow cylinder.

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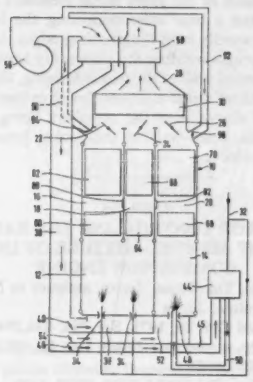
**4,109,613**

## STEAM BOILERS

**Robert Leslie James Hayden, London, and Alan Bell, Cookham, both of England, assignors to Foster Wheeler Energy Corporation, Livingston, N.J.**

**Filed Jun. 6, 1977, Ser. No. 803,817**
**Claims priority, application United Kingdom, Jun. 5, 1976, 18441/76**
**Int. Cl.² F22B *33/00*; F23C *1/08*; F22G *1/00***
**U.S. Cl. 122—1 R** **10 Claims**



1. A steam boiler comprising:
a heavy oil burning furnace,
a separate clean fuel burning furnace,
a first pass through which combustion gases from said heavy oil burning furnace travel,
a second pass through which combustion gases from said clean fuel burning furnace travel, and
a superheater tube bank, chosen from a single superheater tube bank and a finishing or highest temperature superheater tube bank, positioned in said second pass and swept by combustion gases from said clean fuel burning furnace.

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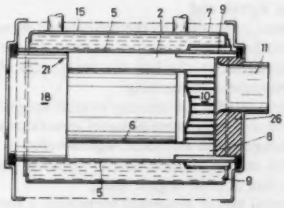
**4,109,614**

## BOILER FOR THE COMBUSTION OF LIQUID OR GASEOUS FUELS

**Hans Viessmann, Im Hain, 3559 Battenberg, Eder, Fed. Rep. of Germany**

**Filed Mar. 28, 1977, Ser. No. 781,642**
**Claims priority, application Fed. Rep. of Germany, Mar. 27, 1976, 2613186**
**Int. Cl.² F22B *7/12***
**U.S. Cl. 122—149** **9 Claims**



1. A boiler for the combustion of liquid or gaseous fuels, which comprises
(a) a water-containing jacket housing having an inner wall defining an interior space,

(b) a cylindrical sleeve defining a fuel combustion chamber arranged in the interior space, and having an open end and a closed end,

(c) a flue gas reversing chamber in the interior space at the open end of the combustion chamber and in communication therewith to receive flue gas therefrom,

(d) a flue gas collecting chamber in the interior space at the closed end of the combustion chamber,

(e) a flue gas discharge in communication with the flue gas collecting chamber for discharging the flue gas from the collecting chamber, and

(f) a series of circumferentially space U-shaped elongated sheet metal members surrounding the cylindrical fuel combustion chamber and defining flue gas channels for conducting flue gas from the reversing to the collecting chamber, each of the sheet metal members consisting of two legs and a base interconnecting the legs, the legs having outwardly bent longitudinal edges, longitudinally extending seams welding the outwardly bent edges of the legs to the inner wall of the jacket housing, the bases of the elongated sheet metal members being in contact with the cylindrical sleeve, and the members being compressed between the inner wall of the jacket housing and the cylindrical sleeve.

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**4,109,615**

## APPARATUS FOR CONTROLLING THE RATIO OF AIR TO FUEL OF AIR-FUEL MIXTURE OF INTERNAL COMBUSTION ENGINE

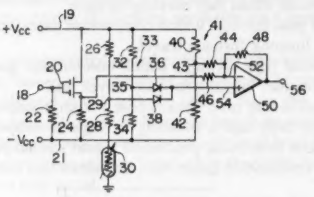
**Masaharu Asano, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Japan**

**Filed Oct. 20, 1975, Ser. No. 624,294**

**Claims priority, application Japan, Oct. 21, 1974, 49/121168; May 14, 1975, 50/55985**

**Int. Cl.² F02M *7/00*; F02B *3/00***

**U.S. Cl. 123—32 EE** **9 Claims**




1. Apparatus for feedback control of the ratio of air to fuel of an air-fuel mixture supplied to an internal combustion engine, which apparatus comprises:

a first sensor for sensing a component of exhaust gases of an internal combustion engine and generating an electrical signal representative thereof;

a differential signal generator connected to the first sensor for generating an electrical signal representative of the differential value between the signal from the sensor and a reference signal; and

control means connected to the differential signal generator for controlling an actuator in response to the differential value therefrom to regulate the mass ratio of air to fuel, the improvement comprising:

a second sensor (**30**) for sensing engine temperature being connected to the differential signal generator and continuously changing the reference signal value in response to the sensed engine temperature to optimize the mass ratio of air to fuel at cold engine start;

the differential signal generator including, a first and a second amplifier (**20, 50**), the first amplifier being connected to the first sensor for amplifying the electrical signal derived therefrom, a first signal generator (**33**) for generating a first signal with a fixed value, said first signal generator comprising a voltage divider for generating a divided voltage corresponding to the first signal and connected over a first diode (**36**) to the second amplifier, a second signal generator (**26, 28**) for generating a second signal, being connected to the second sensor, the second signal being variable in magnitude in response to the engine temperature to decrease with increase of the engine temperature, said second signal generator comprising a voltage divider for generating a second divided voltage corresponding to the second signal, the second signal generator being connected over a second diode (**38**) to the second amplifier, said second diode, means connecting the first and the second diodes in a configuration effective to apply a higher voltage of the first and the second divided voltage to the second amplifier, and the second amplifier being connected to the first and the second signal generator for selectively receiving the first and second signals as the reference signal and for generating the electrical signal representative of the differential value therebetween.

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**4,109,616**

## INJECTION CONTROL SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

**Richard Zechnall, and Günther Baumann, both of Stuttgart, Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany**

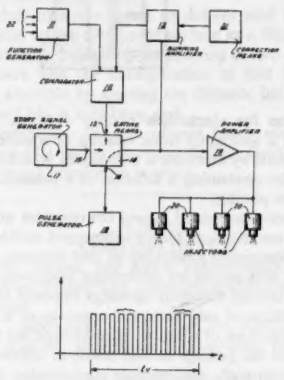
**Continuation of Ser. No. 29,348, Apr. 2, 1970, Pat. No. 3,990,412. This application Nov. 8, 1976, Ser. No. 740,050**

**Claims priority, application Fed. Rep. of Germany, Apr. 4, 1969, 1917487**

**The portion of the term of this patent subsequent to Nov. 9, 1993, has been disclaimed.**

**Int. Cl.² F02B *3/00***

**U.S. Cl. 123—32 EA** **6 Claims**

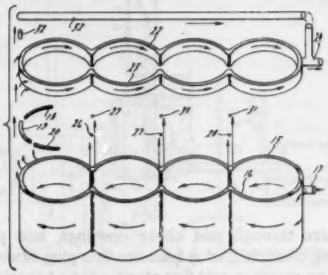


1. In an internal combustion engine having injection means, an arrangement for controlling the quantity of fuel injected by controlling the length of injection time of each injection, comprising, in combination, first signal furnishing means furnishing, as a function of at least one operating parameter of said internal combustion engine, a first signal signifying the desired injection time; means furnishing a start signal for starting an injection; control means responsive to said start signal for furnishing an opening signal to said injection means, said opening signal maintaining said injection means open during application of said opening signal; means connected to said control means for deriving from said opening signal a second signal having at any instant a value dependent upon the duration of said opening signal up to that instant; comparator means receiving said first and second signals and furnishing a terminating signal when said second signal has achieved a predetermined relationship to said first signal; and means for terminating said injection upon generation of said terminating signal.

## 4,109,617
## CONTROLLED FLOW COOLING SYSTEM FOR LOW WEIGHT RECIPROCATING ENGINE

Robert P. Ernest, Dearborn Heights, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 22, 1976, Ser. No. 753,343
Int. Cl.[2] F01P 3/02
U.S. Cl. 123—41.74 35 Claims



1. An engine head having a body consisting of a cast metal having a thermal conductivity exceeding 0.28 calories-cm. per second-cm.[2] - ° C., said body having a flat plane bottom and having opposed sides, the body comprising:

(a) first walls defining a series of cylindrical combustion chamber portions arranged side-by-side, each extending through the bottom of said head, each chamber being the site of an intense periodic heat source during engine operation,

(b) second walls defining a plurality of exhaust gas passages, each extending between one chamber portion and one side of said head, said exhaust passages serving as a second site of an intense heat source during engine operation,

(c) third walls defining a plurality of valve guide cylinders extending from the top of said head into each chamber, said third walls having a portion serving as a separation between said exhaust gas passages and said valve guide cylinders,

(d) first means defining a pair of streamlined liquid cooling flow paths extending in parallel along the sides of each of said chamber portions through said first walls, and

(e) second means defining a streamlined, liquid cooling flow path disposed in said portion of said third walls separating said valve guide cylinders and exhaust gas passages, said first and second means being effective to carry heat away from said heat source sites at a rate equal to or greater than the thermal conductivity of said light metal.

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## 4,109,618
## ROTARY PISTON POWER CONVERTING DEVICES

Leslie E. Daniels, Agincourt, Canada, assignor to Rotary Power Development Limited, Agincourt, Canada

Filed Jan. 19, 1977, Ser. No. 760,689
Int. Cl.[2] F02B 57/00; F01B 13/04
U.S. Cl. 123—43 C 3 Claims

1. An apparatus, comprising:

a substantially disc-like rotor having an outer circumferential surface and two side walls, the rotor being adapted to rotate about a central axis, the rotor defining a plurality of piston chambers each extending from the outer circumferential surface inwardly at an angle to a radiant from said axis, each chamber opening through both side walls,

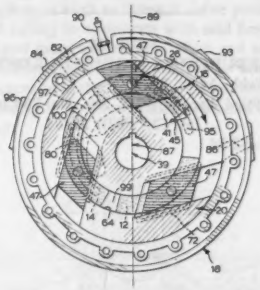
a piston in each chamber,

each piston being pivoted to at least one arcuate drive segment located adjacent one side wall of the rotor,

structure defining a stationary enclosure for said rotor, said structure also defining, adjacent said one side wall of the rotor, an annular recessed channel in which the arcuate drive segments are received, the recessed channel being eccentric with respect to said central axis of the rotor, whereby rotation of the rotor within said stationary enclosure is simultaneous with reciprocatory movement of the pistons in the respective piston chambers,

a fuel inlet manifold in said stationary structure communicating with a first port opening into the piston chambers inwardly of the pistons over a portion of the arc through which a piston is moving outwardly with respect to the rotor;

an exhaust passageway in said stationary structure communicating with a second port opening into the piston chambers outwardly of the pistons at a location advanced in the sense of rotation from the place where a piston is furthest outward, but short of the place where a piston is furthest inward,



by-pass passages in said rotor to allow compressed gas in the part of a piston chamber inwardly of a piston to be transferred to the part of the same piston chamber which is outwardly of the piston when the piston is at or near its innermost position,

means on the stationary structure for initiating combustion of compressed gas outwardly of a piston when the piston is at or near its outermost position, and

further passages connected with further ports communicating with at least one said annular recessed channel where the varying arcuate separations between the segments as the rotor rotates are increasing and decreasing, said further passages being employed to circulate oil for lubrication and cooling.

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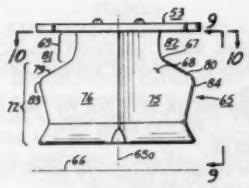
## 4,109,619
## FLOW CONTROL INSERT FOR INTERNAL COMBUSTION ENGINE INTAKE MANIFOLDS

George O. Morris, Newport Beach, Calif., assignor to Fred C. Offenhauser, Newport Beach, Calif., a part interest

Filed Dec. 12, 1975, Ser. No. 640,234
Int. Cl.[2] F02B 75/18
U.S. Cl. 123—52 R 31 Claims



1. An insert for the receiver of a manifold which receives fuel/air mixture and in turn supplies the mixture through a plurality of runners to respective internal engine combustion chambers, the receiver having an inlet opening, a bottom wall and a sidewall, the runners having exit openings in the sidewall

spaced apart from one another around the receiver and below the inlet opening, said insert comprising: a body having a boundary surface in the path of mixture flowing into the receiver from the inlet opening and having an axis facing toward and substantially aligned with said incoming mixture, the portion of the boundary surface which is to be placed nearest to said inlet opening having a surface perimeter extends in planes normal to said axis, which surface is non-circular and and at least in part relieved to form concave curved lines with said normal planes in order to form with the sidewall a plurality of paths for flow of said mixture, the portion of the boundary surface which is to be remote from the inlet opening having a surface configuration to encourage flow of mixture through the exit ports.

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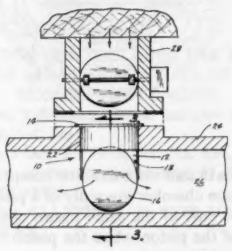
**4,109,620**

## CARBURETION MODIFYING DEVICE

George M. Webb, Ames, Iowa

Filed Apr. 18, 1977, Ser. No. 788,262
Int. Cl.[2] F02B *29/04*
U.S. Cl. 123—52 M 9 Claims



9. In combination with an internal combustion engine having a plurality of cylinders, an intake manifold and a carburetor, said intake manifold having an intake throat in communication with said carburetor, said intake manifold having a fuel-air passageway connecting said throat and said cylinders, said passageway having upper and lower wall portions, the invention comprising,

a sleeve member adapted to be received and securely mounted within said throat, said sleeve having top and bottom portions, and

an eliptical-shaped deflecting partition securely mounted within said sleeve at said bottom portion to deflect the fuel-air mixture from said intake throat into said fuel air passageway, said eliptical deflecting partition having a major and minor axis with said sleeve mounted within said throat so that said minor axis is approximately parallel to the direction of flow of fuel-air mixture in said passageway to said cylinders.

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**4,109,621**

## INTERNAL COMBUSTION TYPE PILE DRIVER

Hiroshi Hashimoto, Akashi, and Kyozo Kimura, Kobe, both of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 14, 1977, Ser. No. 768,617
Int. Cl.[2] F02B *75/02*
U.S. Cl. 123—65 SP 4 Claims

1. An internal combustion type pile driver comprising:

a cylinder having a cylinder wall;

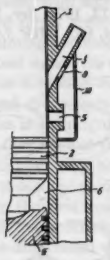
an anvil fitted into the bottom of said cylinder;

a piston in said cylinder above said anvil;

an air intake/exhaust port fixedly provided through said wall thereof above said anvil and communicated with the atmosphere,

said cylinder having a choke opening through said wall thereof between said air intake/exhaust port and said anvil and communicated with the atmosphere; and

plug means fitted into said choke opening for regulating the pressure between the inside said cylinder and the atmosphere through said choke openings, said plug means being comprised of at least one first plug fittable into said choke openings, said first plug having a bore therethrough and a second plug fittable into said choke opening, said second plug being solid.



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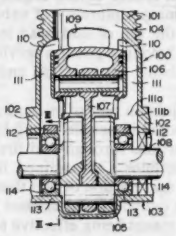
**4,109,622**

## TWO STROKE ENGINES

Tetsuzo Fujikawa, Kobe, and Noriaki Fujii, Akashi, both of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Filed Dec. 14, 1976, Ser. No. 750,453
Claims priority, application Japan, Dec. 16, 1975, 50-150373
Int. Cl.[2] F02B *33/04*
U.S. Cl. 123—73 A 3 Claims



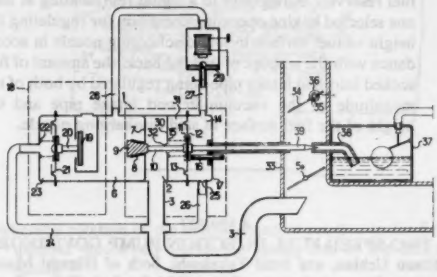
1. Crankcase precompression type two stroke internal combustion engine comprising an integral main body block which includes a cylinder block section having a cylinder bore defined therein and a crankcase upper section, a crankcase lower section connected to the crankcase upper section of the body block to define a crankchamber together with the crankcase upper section, a cylinder head connected with the cylinder block section of the body block, a piston slidably received in the cylinder bore, a crankshaft rotatably disposed in said crankchamber and connected with said piston through a connecting rod, scavenging ports formed in the cylinder block section to open to the cylinder bore, scavenging passages formed in said body block so as to extend substantially parallel with the cylinder bore and having upper ends respectively connected with the scavenging ports, said scavenging passages having substantially straight lower ends communicating with the crankchamber, said crankcase lower section having semicircular recessed means in said crankchamber for receiving bearing means for the crankshaft, and retaining means provided in said crankchamber and secured to the crankcase lower section for cooperation with the recessed means so that said bearing means is retained in the crankchamber on the recessed means of the crankcase lower section.

4,109,623

## REGULATOR FOR AUXILIARY AIR INJECTION AT THE INTAKE OF INTERNAL COMBUSTION ENGINES

Jean-Pierre Rivere, Paris, France, assignor to Regie Nationale des Usines Renault, France

Filed Jul. 8, 1976, Ser. No. 703,331
Claims priority, application France, Jul. 11, 1975, 75 21960
Int. Cl.[2] F02M 7/24
U.S. Cl. 123—119 EC 5 Claims



1. A regulating system for auxiliary air injection at the intake manifold of an internal combustion engine comprising means defining an intake chamber adapted for communication with the intake manifold of an internal combustion engine; means defining an intermediate compartment having an opening for passage of air from said intermediate compartment to said intake chamber; pressure-regulating means for supplying air to said intermediate compartment at a pressure proportional to the intake manifold pressure; and opening-regulating means for regulating passage of air through said opening and including:

a metering valve within said opening;

a membrane connected to said metering valve for actuation thereof;

means defining an outer compartment having a first wall defined at least in part by said membrane;

means defining a first conduit connecting said outer compartment with said intake chamber;

a first choke in said first conduit for controlling the rate of air flow therethrough;

a spring urging said metering valve in a direction to block passage of air through said opening;

means defining a second conduit connecting said outer compartment with said intermediate compartment;

probe means adapted for insertion into the exhaust line of the internal combustion engine for providing an indication of the oxygen content of the engine exhaust;

an electrically-actuated valve in said second conduit; and

means for supplying to said electrically-actuated valve a pulsed actuating current having a pulse frequency dependent upon the speed F of the internal combustion engine and a pulse duration proportional to $S/\sqrt{F}$, where S is the integrated value of the engine exhaust oxygen content indication.

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4,109,624

## VACUUM REGULATION VALVE IN AN EXHAUST GAS RECIRCULATION SYSTEM

Masayuki Washio, Hadano, and Tetsuya Harada, Yokohama, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama and Atsugi Motor Parts Company, Limited, Atsugi, both of, Japan

Filed Dec. 28, 1976, Ser. No. 754,946
Claims priority, application Japan, Dec. 29, 1975, 50-178247[U]
Int. Cl.[2] F02M 25/06
U.S. Cl. 123—119 A 8 Claims

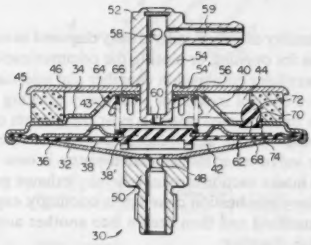
1. In an exhaust gas recirculation system having a recirculation passageway connecting an intake manifold of an internal combustion engine with an exhaust manifold for recirculating a portion of the exhaust gas therethrough, an exhaust gas recirculation valve with a vacuum chamber in the recirculation passageway, a vacuum line connecting a venturi section of a carburetor of the engine with the vacuum chamber, and a vacuum regulation valve operable to regulate the vacuum in said vacuum line for maintaining the proportion of the quantity of the recirculated exhaust gas to the quantity of air admitted into the intake manifold nearly constant, the vacuum regulation valve comprising:

a casing composed of first and second dish shaped members;

an end plate of a generally flat configuration resting on said first dished shape member for defining therebetween a generally annular space;

an air filter lodged in said space;

a flexible diaphragm with an integral valve portion disposed within said casing to cooperate with said first and second dished shaped members to define first and second chambers respectively, said first chamber in communication with the atmosphere through said air filter and said second chamber fluidly in communication with said recirculation passageway;



an air vent conduit member including a connector portion resting on said end plate and a stem portion projecting inwardly of said first chamber, said connector portion formed with branched passages respectively connected to said vacuum line and said stem portion formed with an air vent port in communication with said branched passages, said air vent port adapted to cooperate with the valve portion of said diaphragm which is movable between a first position closing said air vent port and a second position opening same;

a backing plate made of a metal sheet secured on said diaphragm on the side facing said first dish shaped member and movable with said diaphragm;

a coiled spring disposed between said backing plate and said first dish shaped member for urging the valve portion of said diaphragm toward said second portion;

a fastening means for fixedly assembling said air vent conduit member, said end plate and said casing together; and

a buffer means for preventing said backing plate from striking said first dish shaped member.

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4,109,625

## EXHAUST GAS PURIFYING DEVICE FOR INTERNAL COMBUSTION ENGINE WITH AUXILIARY COMBUSTION CHAMBERS

Hideo Kawamura, Yamato, and Kimi Kubota, Chigasaki, both of Japan, assignors to Isuzu Motors Limited, Tokyo, Japan

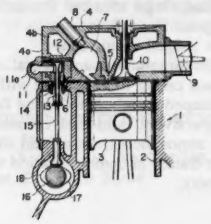
Filed Jan. 28, 1977, Ser. No. 763,749
Claims priority, application Japan, Jan. 31, 1976, 51-10381[U]
Int. Cl.[2] F02D 25/06
U.S. Cl. 123—119 A 3 Claims

1. In an exhaust gas purifying apparatus for a compression ignition type of internal combustion engine including a plurality of cylinders, a cylinder head and a piston reciprocatingly disposed in each cylinder, each cylinder having a main combustion chamber within each cylinder and an auxiliary com-

bustion chamber in said cylinder head communicating therewith through an open port, and an exhaust gas outlet in said head communicating with each main combustion chamber, the improvements characterized by:

(a) an exhaust gas expansion manifold arranged on an outer wall of said cylinder head,

(b) a plurality of exhaust gas passage means individually communicating each auxiliary combustion chamber with said manifold so that said auxiliary combustion chambers are in communication with each other,



(c) a plurality of valves individually disposed in each passage means for opening or closing the communication between said auxiliary combustion chamber and said manifold, and

(d) valve control means for selectively opening each valve when its associated piston is near the bottom of its power expansion stroke simultaneously with the opening of another valve when its associated piston is near the bottom of its intake suction stroke, whereby exhaust gas from one auxiliary combustion chamber is coolingly expanded into the manifold and then drawn into another auxiliary combustion chamber.

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**4,109,626**

**FUEL SUPPLY CONTROL SYSTEM WITH FEEDBACK FUEL PIPE FOR INTERNAL COMBUSTION ENGINE**

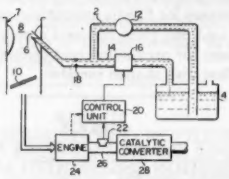
**Shigeo Aono, Seki, and Makoto Anzai, Yokosuka, both of Japan, assignors to Nissan Motor Company, Limited, Japan**

**Filed Apr. 21, 1976, Ser. No. 678,926**

**Claims priority, application Japan, Apr. 22, 1975, 50-48201**

**Int. Cl.[2] F02M *39/00*; F02D *1/06, 37/04***

**U.S. Cl. 123—139 AW** **5 Claims**



1. A fuel supply control system for a carburetor of an internal combustion engine including; a fuel reservoir; a discharging nozzle positioned in a venturi of an intake pipe connected to the intake manifold of the engine; a first fuel pipe extending between said fuel reservoir and said discharging nozzle; wherein the improvement comprises:

(a) a fuel pump provided in said first fuel pipe for supplying fuel from said reservoir to said discharging nozzle;

(b) an orifice disposed in said first fuel pipe downstream of said fuel pump;

(c) a second fuel pipe extending between said fuel reservoir and said first fuel pipe downstream of said fuel pump and upstream of said orifice, said second fuel pipe being arranged to feedback the fuel downstream of said fuel pump to said fuel reservoir; and

(d) fuel flow rate control means provided in said second fuel pipe to control the amount of fuel being fed back to said fuel reservoir in response to a signal representing at least one selected engine operating condition for regulating the height of fuel surface in said discharging nozzle in accordance with the amount of fuel fed back, the amount of fuel sucked into said intake pipe being regulated by both of the magnitude of the vacuum in said intake pipe and the height of the fuel surface in said discharging nozzle.

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**4,109,627**

**TWO-SPEED FUEL INJECTION PUMP GOVERNOR**

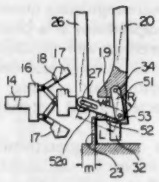
**Mitsuo Uchino, and Seizi Takahashi, both of Higashi Matsuyama, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan**

**Filed Nov. 3, 1976, Ser. No. 738,206**

**Claims priority, application Japan, Nov. 5, 1975, 50-150823[U]**

**Int. Cl.[2] F02D *1/04***

**U.S. Cl. 123—140 R** **12 Claims**



1. In a two-speed fuel injection pump governor for an engine, comprising flyweight means rotated at a speed proportional to the engine speed, a speed control member for controlling the speed of the engine, and limiting linkage means operatively connecting the speed control member to the flyweight means to progressively limit movement of the flyweight means in a fuel injection increasing direction as the speed control member is moved toward a maximum speed demand position such that the amount of fuel injection increase during low speed regulation is reduced in proportion to the engine load.

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**4,109,628**

**ADJUSTABLE REGULATION GOVERNOR**

**Robert H. Miller, Peoria, and Harold C. Davidson, Chillicothe, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Nov. 8, 1976, Ser. No. 739,419**

**Int. Cl.[2] F02D *1/04*; F16H *55/16***

**U.S. Cl. 123—140 R** **12 Claims**

1. Apparatus for selectively varying the spring rate of a helical spring comprising:

a first member defining threads of a first pitch;

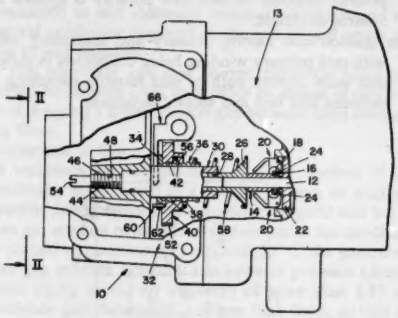
a second member defining threads of the first pitch in threaded engagement with the threads of the first member;

the second member defining helical channel means of a second pitch different from the first pitch;

a reaction member;

the helical spring being in contact with the reaction member

and having a portion disposed through the helical channel means;



whereby rotation of the second member relative to the first member selectively varies the spring rate of the helical spring.

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**4,109,629**

**FUEL INJECTION PUMPING APPARATUS**

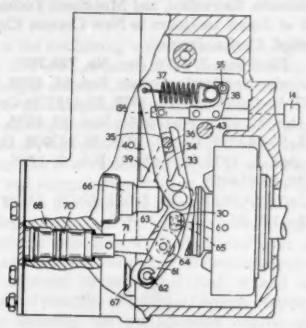
James Charles Potter, London, England, assignor to C.A.V. Limited, Birmingham, England

Continuation of Ser. No. 587,886, Jun. 18, 1975, abandoned, which is a continuation of Ser. No. 457,475, Apr. 1, 1974, abandoned. This application Oct. 29, 1976, Ser. No. 737,034

Claims priority, application United Kingdom, Apr. 1, 1974, 16486/74

Int. Cl.[2] F02D *1/04*

U.S. Cl. 123—140 R 6 Claims



1. A fuel injection pumping apparatus for supplying fuel to an associated internal combustion engine, comprising an injection pump having an axially movable control rod for determining the amount of fuel delivered by the injection pump at each injection stroke, governor means comprising a first pivotal link mounted about a fixed axis, a second pivotal link pivotally connected at one end to the first link at a position removed from said fixed axis, a slot defined in said second link, pivot means located in said slot, operator-adjustable means for adjusting the position of said pivot means within said slot, said second link being operatively connected at its other end to said control rod, a spring biased weight mechanism responsive to the speed of the associated engine, a servo-mechanism for effecting movement of the said first link about said fixed axis, an operating member for the servo-mechanism, means coupling said operating member to said weight mechanism so that movement of the weight mechanism with increasing speed will effect, through the servo-mechanism, movement of said first link in a direction to reduce the fuel supply to the engine and vice versa, said servo-mechanism acts to isolate the weight mechanism from forces acting on the control rod.

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**4,109,630**

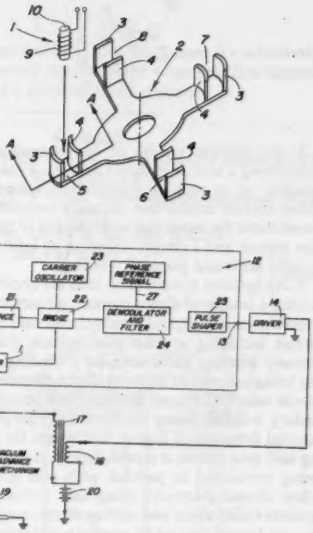
**BREAKERLESS ELECTRONIC IGNITION SYSTEM**

William E. Richeson, Jr., Fort Wayne, and Gerald L. Kray, Butler, both of Ind., assignors to The Magnavox Company, Fort Wayne, Ind.

Filed May 17, 1976, Ser. No. 687,269

Int. Cl.[2] F02P *1/00*

U.S. Cl. 123—148 E 5 Claims




1. A timing signal source for an internal combustion engine, comprising:

a rotatable means having at least one tyne of a ferro-magnetic material and adapted to be coupled to the engine for providing a relative angular rotation therewith;

a sensor means including an inductor mounted in close proximity to said rotatable means and having an impedance which varies as a function of the relative angular position between the sensor means and the tyne of said rotatable means for providing a predetermined sensor property at a predetermined rotational position of the engine;

a reference means including an inductor for providing a predetermined impedance;

a signal generating means having output terminals for providing a constant frequency carrier signal;

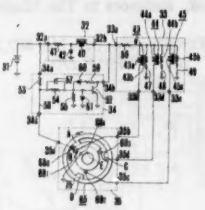
a bridge network means having at least first and second parallelled signal branches connected to the output terminals of said signal generating means and having said sensor means connected in the first branch and said reference means connected in the second branch for providing a predetermined relationship of signal currents in the first and second branches at said predetermined rotational position of the engine; and

a detector means connected to said bridge means for detecting said predetermined relationship of signal currents in the first and second branches and for providing in response thereto an output signal indicative of said predetermined rotational position of the engine.

## 4,109,631
## IGNITION SYSTEMS OF INTERNAL COMBUSTION ENGINES

Hiroyasu Miyao, Hamamatsu, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

Filed Oct. 13, 1976, Ser. No. 732,041
Claims priority, application Japan, Oct. 17, 1975, 50-141520[U]; Jun. 23, 1976, 51-74683
Int. Cl.² F02P 1/00
U.S. Cl. 123—148 CA 9 Claims



1. An ignition system of an internal combustion engine, comprising a source of direct current, a reactor, and a primary winding of an ignition transformer connected in series in a direct current conductive circuit, a secondary winding on said transformer for supplying a spark plug of said internal combustion engine, and a circuit including an interrupter connected in parallel with said primary winding.

2. An ignition system of an internal combustion engine comprising a source of direct current, a reactor circuit, an ignition transformer circuit, and a gate circuit said ignition transformer circuit including at least one ignition transformer having a primary winding and a secondary winding, said primary winding being connected in series direct current conductive circuit across said DC source through said reactor circuit, said secondary winding being connected across a spark plug of said internal combustion engine, and means for ON/OFF-controlling said gate circuit at a predetermined period, said gate circuit being connected in parallel with said primary winding and when closed short-circuiting said primary winding of said ignition transformer and storing electromagnetic energy in said reactor circuit, and when opened supplying said stored electromagnetic energy in said reactor circuit, and when opened supplying said stored electromagnetic energy and current from said DC source to said primary winding thus inducing high voltage in said secondary winding for operating said spark plug.

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## 4,109,632
## GTO IGNITION CIRCUIT

Ronald Robert Brooks, Trenton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 1, 1976, Ser. No. 737,916
Int. Cl.² F02P 7/00; H03K 17/72
U.S. Cl. 123—148 E 15 Claims

1. An ignition circuit for an internal combustion engine, comprising:

first and second terminals for receiving an operating voltage and a reference voltage, respectively;

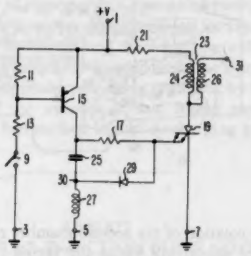
timing switch means responsive to the crankshaft position of the engine selectively to provide a conductive path between said first terminal and a third terminal;

a capacitor connected between said third and a fourth terminal;

an inductor connected between said fourth and second terminals in a series resonant circuit with said capacitor and responding to conduction of said timing switch means to build up a self-induced field;

bistable switching means having a control electrode and having a selectively conductive main current path which becomes conductive after sufficiently large current of a first polarity is applied to said control electrode and nonconductive after sufficiently large current of a second polarity opposite to said first polarity is applied to said control electrode;

an ignition coil having primary and secondary windings with said primary winding being connected in series with said main current path of said bistable switching means between said first and second terminals;



a resistor connected between said third terminal and the control electrode of said bistable switching means; and

unidirectionally conductive means connected between said fourth terminal and the control electrode of said bistable switching means with a poling to conduct the current supplied by said inductor during collapse of its self-induced field.

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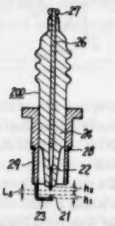
## 4,109,633
## SPARK-PLUG FOR AUTOMOBILE INTERNAL COMBUSTION ENGINE

Hiroyuki Mitsudo, Kawanishi, and Masazumi Yoshida, Amagasaki, both of Japan, assignors to New Cosmos Electric Company Limited, Osaka, Japan

Filed Sep. 7, 1976, Ser. No. 720,798
Claims priority, application Japan, Sep. 16, 1975, 50-110873; Sep. 16, 1975, 50-110874; Oct. 2, 1975, 50-118270; Oct. 17, 1975, 50-124267; Oct. 31, 1975, 50-130484; Nov. 17, 1975, 50-137279; Dec. 3, 1975, 50-142908; Dec. 3, 1975, 50-142909; Dec. 3, 1975, 50-142910; Dec. 3, 1975, 50-142911; Feb. 9, 1976, 51-012249; Feb. 14, 1976, 51-014407
Int. Cl.² F02P 1/00; H01T 13/20, 13/28
U.S. Cl. 123—169 EL 37 Claims



1. An electric spark-plug for automobile internal combustion engine comprising:

a metallic screw portion to be engaged with an internal combustion engine,

an electrode terminal part,

an electric insulator for supporting said screw part and said electrode terminal part in a coaxial relation, keeping them insulated from each other, and

at least a pair of electrodes, the pair including a first electrode and a second electode,

said first electrode being supported by a supporter formed on the metallic screw part,

said second electrode being rod-shaped and electrically connected to said electrode terminal part by means of a central conductor disposed on the axis of said screw part and in said insulator,

said first electrode and said second electrode being supported insulatedly from each other by means of said insulator, keeping a given ignition gap between their discharging faces,

characterized in that:

fluid resistance against gas flow of flame nucleus of said electrodes is decreased in a manner to have an ability of ignition that is defined by capability to ignite and burn a lean gas mixture of isobutane and air under the conditions of normal temperature (T) of about 20° C, the pressure of lean gas mixture equals 1 atmospheric pressure (density index $\epsilon \approx 1$), excess air ratio (F) of more than 1.25 and electrode gap distance ($L_s$) of less than 2mm, so that the following ignition conditional inequality applies thereby to decrease the thermal conductance G from the flame nucleus to the electrodes:

$$J > \frac{G}{V}\left\{\frac{\exp(E_b/RT)}{(\alpha-1)B\epsilon^{n+m\bullet}} \cdot \frac{(n+4.773\,mF)^{n+m\bullet}}{3.773^{m}\,n^{n}m^{m\bullet}\,(X_i-X_j)^{n+m\bullet}\,F^{m\bullet}}\right\} \quad (1)$$

wherein J, $\epsilon$ and $m^\bullet$ are given by

$$J = [E_b(T_s - T_o) + RT_s^2]/\pi RT_s^2,$$

$$\epsilon = [(760 - p^-)/760]\,R_c,$$

$$m^\bullet = (1+\gamma)m,$$

wherein V is the nucleating volume size and is represented by an equation of $V = \theta L_3$ wherein $\theta$ is a proper constant and $L_3$ is the electrode gap distance, T is a temperature of the nucleating volume, $T_o$ is the temperature of the electrodes, $X_i$ is a molar density in 1 atmospheric pressure of incombustible gases other than nitrogen, F, $\epsilon$ $p^-$ and $R_c$ are excess air ratio, density index of molecules, absolute value of negative pressure (mm Hg) in intake pipe and compression ratio at the time of ignition, respectively, in the gas mixture, J being practically a constant when the dependences of the singular point temperature $T_s$ upon the variable quantities V, G, $X_i$, F and $\epsilon$ are sufficiently small, $E_b$ is an activation energy in Arrhenius' equation, and is a constant inherent to individual fuel, n and m are the molecularities of reaction of fuel and oxygen, respectively, $\gamma$ is a parameter showing the participation degree of nitrogen molecules in reaction process, $\alpha$ is a multiplication factor of chain carriers, R is a gas constant, B, $X_i$ and $\pi$ are constants, respectively.

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**4,109,634**

## APPARATUS FOR MODIFYING AN INTERNAL COMBUSTION ENGINE

**Arthur Garabedian, 1111 Glenview Dr., Fullerton, Calif. 92634, assignor to Dudley B. Frank and Arthur Garabedian, both of Santa Ana, Calif.**

**Continuation of Ser. No. 503,718, Sep. 6, 1974, Pat. No. 4,019,479. This application Mar. 4, 1977, Ser. No. 774,343**

**Int. Cl.² F02D *9/00*; F02M *13/04***

**U.S. Cl. 123—198 F** **8 Claims**

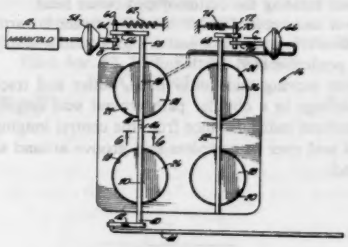
1. A split engine comprising:

a pair of carburetor barrels, each connected to independently controlled cylinders of said engine;

a first throttle valve for selectively closing one of said pair of barrels;

a second throttle valve for selectively closing the other of said pair of barrels;

first means for selectively opening said first throttle valve; and



second means responseive to said first means for selectively opening said second throttle valve when said first throttle valve is opened a predetermined distance.

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**4,109,635**

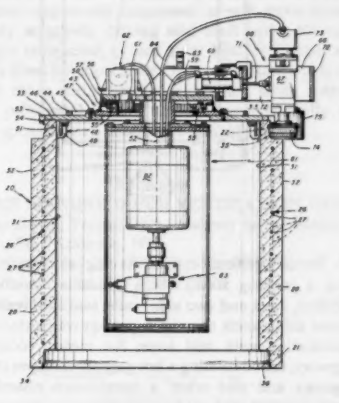
## MACHINE GROOVED JOINT ON HOLLOW CONCRETE CYLINDERS

**John C. Rossborough, 8 Upper Flanders Rd., Amherst, N.H. 03031**

**Filed Sep. 10, 1976, Ser. No. 722,266**

**Int. Cl.² B28D *1/16***

**U.S. Cl. 125—10** **7 Claims**



1. The method of machining an annular groove around the exterior surface of the spigot end of a reinforced concrete manhole riser by means of a circular track frame mounted across said spigot end, a carriage mounted to move around the circular track, a linear track extending radially on said carriage, a cutter head movable along said linear track and a rotary cutter depending from said head, said method comprising the steps of

precisely centering said circular track frame relative to the longitudinal axis of said riser,

power moving said carriage around said circular track frame at a controlled velocity,

power rotating said rotating cutter of said cutter to rotate in a horizontal plane on a vertical axis;

and power moving said cutter head along said linear track to a position thereon to form an annular groove in said spigot end said groove having an inner wall at a predetermined, uniform radial distance from said axis as said carriage travels in a circular path around said axis.

7. The method of machining an annular groove around the

spigot end of a manhole riser, by means of a rotary cutter head movable radially on the linear track of a carriage, the carriage being movable in a circular path around a frame, supported across said spigot end, said method comprising the steps of

power rotating the cutter of said cutter head

power moving said cutter head and cutter inwardly on said linear track to form a part of a groove in said spigot end to a predetermined depth and

power moving said cutter head, cutter and track on said carriage in a circular path around said spigot end at a uniform radial distance from the central longitudinal axis of said riser to complete said groove around said spigot end.

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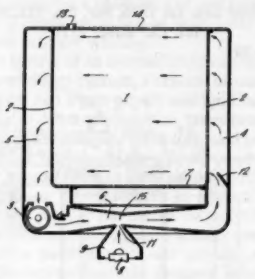
**4,109,636**

## FORCED CONVECTION OVENS

**Donald Richard Burge, London, England, assignor to British Gas Corporation, England**

**Filed Dec. 22, 1976, Ser. No. 753,433**
**Int. Cl.² A21B *1/26***
**U.S. Cl. 126—21 A** **2 Claims**



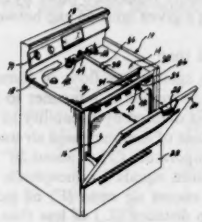
1. A forced convection oven having an openable chamber defining a cooking zone, which openable chamber includes top, bottom, back and two side walls, said side walls including apertured side panels therein; a passageway exteriorly of but communicating with said zone; fan means, located in said passageway, for circulating a hot gaseous medium through said passageway and said zone; a combustion chamber; a fuel burner associated with said combustion chamber whereby, in operation, hot combustion burner gases issuing from said combustion chamber mix with the circulating gaseous medium in said passageway and enter said zone; and means for venting said zone to atmosphere; the improvement wherein said passageway is of substantially U-shaped form including two vertical limbs and surrounds said bottom wall and said two apertured side panels, the base part of said U-shaped passageway defining a pressure-reducing throat having a restricted portion positioned beneath, but spaced from, said bottom wall, the two vertical limbs of said U-shaped passageway defining inlet and outlet manifolds, exteriorly adjacent a respective one of said two side panels, for communicating said passageway with said zone through the apertures in said side panels; said combustion chamber being located below said throat with the outlet thereof communicating with the restricted portion of said throat, said fan means being located in said passageway upstream of said throat and arranged in operation forcibly to circulate the hot gaseous medium of air and hot combustion products from said burner substantially horizontally across said zone from said inlet manifold to said outlet manifold.

**4,109,637**

## LATCH MECHANISM FOR PYROLYTIC RANGE

**Claude Drouin, Montmagny, Canada, assignor to Les Industries BFG Limitee, Montmagny, Canada**

**Filed Jan. 6, 1977, Ser. No. 757,433**
**Int. Cl.² F23M *7/00***
**U.S. Cl. 126—197** **5 Claims**



1. A combination pyrolytic range, having a high temperature self cleaning cycle and a latch mechanism therefor comprising an oven structure, an oven cavity defined in said oven structure and a door for covering said oven cavity, and a locking mechanism for said door during said self-cleaning cycle comprising: a latch arm pivotally mounted to said oven structure and adapted to move between a door locking position and a door unlocked position, said door having means for receiving said latch arm, said arm having one end extending towards said door for locking engagement therewith; a pair of solenoids mounted to said structure, each solenoid including a movable magnet bar coupled to said latch arm whereby said bars are simultaneously displaceable for each separate energization of said solenoids; a first of said bars being actuatable, when the solenoid associated therewith is energized, to move said arm to said door locking position; a second of said bars being actuatable, when the solenoid associated therewith is energized, to move said arm in said door unlocked position; and spring means maintaining said arm in each position reached by said arm.

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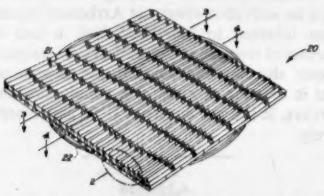
**4,109,638**

## SOLAR ENERGY CONVERTER CAROUSEL

**William C. Matlock, and Patricia Matlock, both of 2123 S. Priest #216, Tempe, Ariz. 85282**

**Filed Apr. 4, 1977, Ser. No. 784,581**
**Int. Cl.² F24J *3/02***
**U.S. Cl. 126—271** **3 Claims**



1. An improved heat exchange means comprising:

a frame,

said frame being rotatably mounted on a support for movement through an arcuate path,

at least a pair of juxtapositioned reflectors,

each of said reflectors comprises a trough having a reflecting surface having a parabolic configuration,

means for pivotally mounting each of said reflectors in a parallel arrangement on said frame,

a fluid bearing tube extending longitudinally of each of said reflectors on said frame and approximately disposed with the axis of a portion of said tube in the focal zone of an

associated reflector outside of the periphery of its parabolic configuration,

electric means for moving said reflectors independently of said frame in unison through a similar arc partially around the portion of the tube associated with each of the reflectors for maintaining said reflectors with the axis of their curvature approximately in a plane containing the sun's center, and

means for sensing the position of the sun for energizing said electric means for moving said frame and said reflectors independently of each other to orient and maintain said frame and reflectors with their axes of curvature of their reflective surfaces approximately in a plane containing the sun's center,

said means for sensing the position of the sun comprising an electric motor mounted on said frame for driving said frame sequentially back and forth around at least a portion of said support,

whereby the reflection of the sun's rays are concentrated by said reflectors in a line image along said portions of said tubes.

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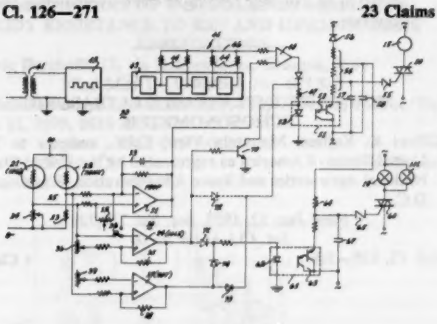
**4,109,639**

## SOLAR HEATING SYSTEM

**Partick J. Keegan, Van Nuys, Calif., assignor to Rho Sigma, North Hollywood, Calif.**

**Filed Jun. 13, 1977, Ser. No. 805,695**
**Int. Cl.[2] F24J *3/02***
**U.S. Cl. 126—271** **23 Claims**



1. In a system for transferring thermal energy between a storage tank for water and a solar heat exchanger and collector, there being a pump for pumping water from the tank through the heat exchanger and back into the tank, a first temperature sensitive element for sensing the temperature of the water as leaving the heat exchanger or as being held therein; a second temperature sensitive elememt for sensing the temperature of the water in the tank or as leaving the tank; and a bridge circuit which includes the first and second element and adjusted to provide for a signal representing the effective difference in temperature; the combination comprising: a difference amplifier connected across the bridge circuit to receive said bridge circuit signal and to provide an output signal proportionate to said difference;

a staircase signal generator providing a stepwise increasing signal on a cyclically repetitive basis, the steps occurring in synchronism with an AC voltage;

a comparator connected to receive said output signal and said staircase signal and providing a pulse train at a pulse rate frequency corresponding to the cyclic repetition of the staircase signal, the pulses having duration in proportion to said difference but in unit steps equal to an AC cycle; and

an AC operated control circuit for the pump and responsive to said pulses to turn the pump on and off at instants corresponding to AC signal zero crossings so that the pump is operated by a sequence of pulses each being composed of a plurality of full AC waves.

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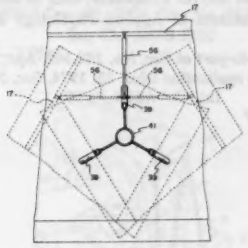
**4,109,640**

## SOLAR HEATING SYSTEM

**Lynwood L. Smith, 2915 Pink Hill Rd., Kinston, N.C. 28501**

**Filed Apr. 12, 1976, Ser. No. 676,534**
**Int. Cl.[2] F24J *3/02***
**U.S. Cl. 126—271** **8 Claims**



1. In a solar heating system including operatively connected solar energy heat exchanger means, heat storage means, and use heat exchanger means, the improvement comprising: a solar heat exchanger support base; a shaft rotatively mounted on said base; said solar energy heat exchanger means mounted on said shaft; a drive means operatively connected to said shaft; control means operatively connected to said drive means for progressively rotatively driving said shaft and a tilt support means toggly connected to said solar heat exchanger at one end and to a fixed point off center from the rotative axis of said shaft at the other end whereby said panel, when rotated to follow the movement of the sun, will automatically tilt to follow the up and down movement of said sun.

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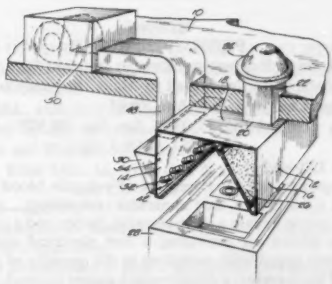
**4,109,641**

## ADAPTER MANIFOLD FOR VENTILATION HOOD

**Dean L. Hunzicker, Verona, Wis., assignor to Air Master Systems, Inc., Fort Atkinson, Wis.**

**Filed May 25, 1977, Ser. No. 800,386**
**Int. Cl.[2] F24C *15/20***
**U.S. Cl. 126—299 D** **6 Claims**



1. In combination a ventilating hood having spaced front and rear walls which cooperate to define a lower hood inlet, a top wall connected to said front and rear walls, an exhaust outlet in said top wall, a grease filter located between said hood inlet and said exhaust outlet and the improvement comprising an adapter manifold for supplying outside untempered air to the hood, said manifold having walls defining an elongated air chamber having an inlet connectable to an untempered air source, one of said walls containing a plurality of openings, a

plurality of tubes, and means for mounting said tubes in said openings to provide communication with said air chamber, and said manifold being adapted to be mounted on said hood front wall with said tubes extending through openings in said hood wall to direct untempered outside air into said hood between said filter and said hood outlet.

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**4,109,642**

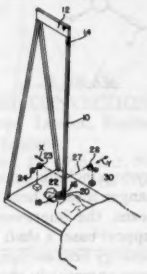
## APPARATUS FOR ULTRASONIC ARTERIOGRAPHY

**John M. Reid, and Merrill P. Spencer, both of Seattle, Wash., assignors to Institute of Applied Physiology & Medicine, Seattle, Wash.**

**Continuation-in-part of Ser. No. 240,349, Apr. 3, 1972, abandoned. This application Mar. 25, 1974, Ser. No. 454,423**

**Int. Cl.[2] A61B *10/00***

**U.S. Cl. 128—2 V** **24 Claims**



1. A method of detecting the flow picture in vessels in human tissue containing moving sound scatterers, comprising:

transmitting and receiving the reflections of an ultrasonic continuous sound wave focused to a width of less than half the diameter of the vessel at a depth where sound scatterers are located through a sound transmitting medium into the tissue in a small region expected to contain the vessels being investigated, thus receiving flow information from said small region to the exclusion of surrounding regions;

detecting the presence of the moving scatterers in the vessels within said small region using the doppler effect;

systematically transmitting and receiving over the desired vessel to produce a clearly defined pattern; and

converting the ultrasonic reflected signals to a visually detectable output.

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**4,109,643**

## PERFUSION METER

**Albert K. Bond, Burlington; Edwin B. Merrick, Stow, and Larry Lee Nielsen, Burlington, all of Mass., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Jun. 17, 1976, Ser. No. 696,973**

**Int. Cl.[2] A61B *5/02***

**U.S. Cl. 128—2 L** **3 Claims**

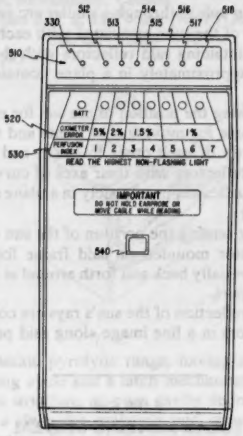
1. Apparatus for measurement of pulsatile blood flow rate through a tissue area, said apparatus comprising:

input means having a light-emissive device and a photosensitive device for providing a first electrical signal in response to pulsatile variations in the quantity of light from said light-emissive device which passes through said tissue and which falls on said photosensitive device;

second means coupled to the input means for providing a second electrical signal which has a logarithmic relationship to said first electrical signal;

display means coupled to the second means for providing a visual indication in response to said second electrical signal, said display means including a plurality of indicators, a corresponding legend, and means for activating said indicators in response to said second electrical signal;

said legend comprising a first set of symbolic markings approximately representing an average pulsatile blood flow rate; and




said legend further comprising a second set of symbolic markings representing the approximate error to be expected in an oximeter reading at the corresponding blood flow rate.

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**4,109,644**

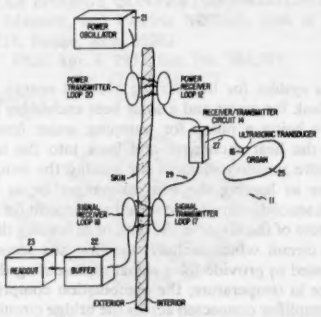
## MINIATURE IMPLANTABLE ULTRASONIC ECHOSONOMETER

**Gilbert K. Kojima, Mountain View, Calif., assignor to The United States of America as represented by the United States National Aeronautics and Space Administration, Washington, D.C.**

**Filed Jan. 12, 1977, Ser. No. 758,721**

**Int. Cl.[2] A61B *10/00***

**U.S. Cl. 128—2 V** **1 Claim**




1. An implantable biomedical echosonometer for taking real-time dimensional measurements of an organ in an animal comprising:

A. a sealed implantable assembly comprising:

a. a power receiver loop,

b. a transformer with a primary winding and low and high voltage secondary windings; said power receiver loop being coupled to said primary winding, said loop being remote from said primary winding whereby said loop can be easily located directly below said animal's skin;

c. means for converting the output of said low voltage winding to a regulated d-c voltage;

d. means for producing timing pulses;
e. means coupled to said high voltage winding and said producing means for generating high voltage pulses at a rate set by said timing pulses;
f. an ultrasonic transducer adapted to be affixed to the organ to be measured;
g. a signal transmitter loop; and
h. a high gain amplifier powered by said regulated d-c voltage, the input of said amplifier being coupled to said pulse generating means and said transducer, the output of said amplifier being coupled to said signal transmitter loop, said amplifier being operable to amplify the pulses from said pulse generating means and echo waveforms received by said transducer caused by ultrasonic reflections from interfaces in said organ, said signal transmitter loop being remote from said amplifier so that said signal transmitter loop can be easily positioned directly beneath said animal's skin;

B. a power transmitter loop adapted to be disposed outside the animal's skin near said power receiver loop;
C. a power oscillator connected to said power transmitter loop, said oscillator and loop being operable to inductively transmit electric power to said power receiver loop;
D. a signal receiver loop adapted to be disposed outside said animal's skin near said signal transmitter loop; and
E. means for reading out signals inductively coupled to said signal receiver loop from said signal transmitter loop.

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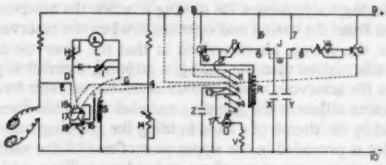
**4,109,645**

## DEVELOPMENT OF INSTRUMENTS MEASURING BODY RESISTANCE TO ION AND IONOPHORESIS APPLICATIONS

**Sancio Bacchelli, 12, via Indipendenza, Bologna, Italy**

**Filed May 17, 1976, Ser. No. 687,333**
**Claims priority, application Italy, May 23, 1975, 3420 A/75; Dec. 11, 1975, 3614 A/75**
**Int. Cl.² A61B 5/05**
**U.S. Cl. 128—2.1 Z** **4 Claims**



1. An instrument for measuring body resistance to ion and ionophoresis applications, comprising

a reading circuit means including a reading meter for providing a reading of resistance values after an established period during which the resistance values become stable,

a principal circuit including electrodes adapted to be positioned on the body, a bridge means operatively connected to said electrodes and to said reading circuit means for measuring body resistance derived from said electrodes and for supplying the measurement to said reading circuit means and two transistor means for initially obstructing current to said bridge means,

two condenser means releaseably operatively connected to said two transistor means, respectively, through said bridge means, for discharging and activating said two transistor means, said two condenser means for cooperating with said bridge means for providing a discharging time thereof equal to a time necessary for the body resistance values to become stable,

two relay means being operatively connected to said two transistor means, respectively, and one of said two relay means being operatively connected to said reading circuit means, said relay means being activated by current circulating in said two transistor means, respectively, and said one of said relay means for closing said reading circuit means when one of said two transistor means is activated during the discharging time of one of said two condenser means and for connecting said reading circuit means to said bridge means after said one condenser means discharges.

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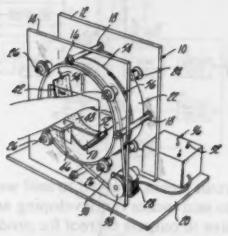
**4,109,646**

## AUTOMATIC BLOOD PRESSURE CUFF APPLICATOR

**Robert B. Keller, Ann Arbor, Mich., assignor to Weisman & Allen, Madison Heights, Mich.**

**Filed Dec. 20, 1976, Ser. No. 752,567**
**Int. Cl.² A61B 5/02**
**U.S. Cl. 128—2.05 C** **19 Claims**



1. An arrangement for encircling a body member with an inflatable flexible cuff comprising:

an inflatable flexible cuff adapted to be extended with separated ends;

support means for positioning a body member with respect to said flexible cuff;

means for disposing said cuff in an extended position opposite a body member positioned by said support means;

means for restraining movement of one end of said flexible cuff with respect to said support means;

means for moving the other end of said flexible cuff about a body member supported by said support means to overlap said one end whereby said flexible cuff encircles said body member, said means for moving including a rotary member extending about said support means and said flexible cuff and connected to said other end of said cuff and further including means rotatably supporting said rotary member for rotation about said support means and said flexible cuff; and

means for inflating said flexible cuff after rotation of said rotary member to encircle said body member.

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**4,109,647**

## METHOD OF AND APPARATUS FOR MEASUREMENT OF BLOOD FLOW USING COHERENT LIGHT

**Michael D. Stern, Rockville, and Donald L. Lappe, Baltimore, both of Md., assignors to The United States of America as represented by the Secretary of the Department of Health, Education and Welfare, Washington, D.C.**

**Filed Mar. 16, 1977, Ser. No. 778,083**
**Int. Cl.² G01P 3/36**
**U.S. Cl. 128—2.05 F** **39 Claims**

24. An apparatus for measuring the flow of flowing material, the apparatus comprising:

means for illuminating at least a portion of the flowing material with coherent light;

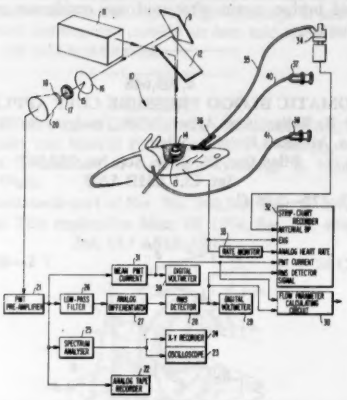
means for collecting backscattered light from the material;

photo-detector means responsive to the collected light for developing a broadened spectrum of low frequency signals, said photo-detector means producing a mean current and having a substantially constant shot noise output S;

means coupled to said photo-detector means and responsive to its output for developing an output signal I representative of the mean current thereof;

weighted detector means coupled to said photo-detector and

responsive to the broadened spectrum of low frequency signals for developing an output signal R; and



calculating circuit means coupled to said weighted detector means and to said means for developing an output signal I and responsive to outputs thereof for producing an output signal F representative of the flow.

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**4,109,648**

## ELECTRODE ASSEMBLIES

**John Reginald Larke, Birmingham; Colin Barber, Underwood, and David John Cotterill, Birmingham, all of England, assignors to National Research Development Corporation, London, England**

**Filed Dec. 15, 1976, Ser. No. 750,853**

**Claims priority, application United Kingdom, Dec. 18, 1975, 51855/75**

**Int. Cl.² A61B *5/04***

**U.S. Cl. 128—2.06 E** **11 Claims**

1. An electrode assembly for application to the skin to detect electrophysiological signals, comprising a self-supporting body of hydrogel material, and an electrochemically inert elongate member having carbon therein to render it conductive, said member projecting from said body with one end portion thereof embedded in and connected to said body.

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**4,109,649**

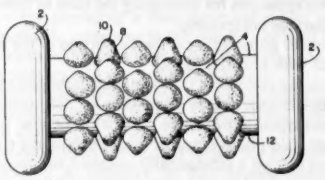
## FOOT MASSAGER

**Arthur N. Iyomasa, 888 Mililani St., PH, Honolulu, Hi. 96813**

**Filed Aug. 30, 1976, Ser. No. 718,606**

**Int. Cl.² A61H *15/00***

**U.S. Cl. 128—57** **8 Claims**



1. A foot massaging apparatus comprising toroidal members freely rollable on a flat supporting surface and spaced a distance greater than transverse dimensions of a foot, an intermediate concentric cylindrical member of diameter less than the diameter of the toroidal members connecting the toroidal members, the outer surface of the cylindrical member having a plurality of parallel annular rows of closely spaced projections arranged in staggered meshing relationship to engage the bottom of a foot under pressure and massage said foot when the toroidal members are rolled on the supporting surface.

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**4,109,650**

## RESERVOIR WITH HANDLE AND COVER

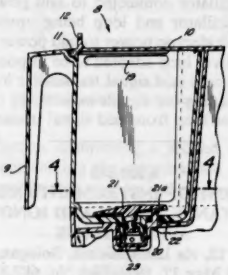
**Michel Peclard, Fianarantsoa, Madagascar, assignor to Les Products Associes LPA SA, Switzerland**

**Filed Apr. 6, 1976, Ser. No. 674,151**

**Claims priority, application Switzerland, Apr. 8, 1975, 004422/75**

**Int. Cl.² A61H *9/00***

**U.S. Cl. 128—66** **6 Claims**



1. A buccal hygiene apparatus comprising a casing enclosing a hydraulic pump and motor unit, a handpiece connected to the casing by a flexible tubing, and a reservoir removably fitable on the casing in a position for supplying water to the pump and motor unit via an outlet in the bottom of the reservoir, said outlet having valve means for closing it when the reservoir is removed from the casing and opening it when the reservoir is fitted on the casing, characterized in that the reservoir is of smaller dimensions than the casing, a gripping member is provided on the reservoir, a lid is provided on the reservoir having a projection adjacent the gripping member to enable opening of the lid by the thumb of a hand holding the gripping member, and a slot is provided in the upper part of one of the walls of the reservoir to prevent overflow and reduce spilling, said slot being defined by portions of one of the walls of the reservoir, the wall portions completely surrounding the slot.

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**4,109,651**

## ANESTHETIC GAS EXHAUST SYSTEM

**Allan M. Steigerwald, 9860 SW. Eagle La., Beaverton, Oreg. 97005**

**Filed Nov. 19, 1975, Ser. No. 633,225**

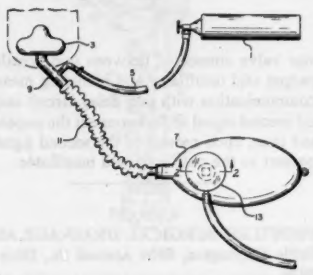
**Int. Cl.² A61M *16/00***

**U.S. Cl. 128—145.8** **6 Claims**

6. An overflow gas discharge control and exhaust system for a non-rebreathing apparatus of the type including a breathing bag formed of a resiliently deformable material and provided with a bleed opening in a wall thereof sized to be blocked by the thumb of an apparatus operator, said system comprising in combination:

an operator thumb actuated valve device including a body adapted to be fixed to said breathing bag within said bleed opening and an actuator fixed to said body, said body including a bottom wall, a base portion depending from said bottom wall and cooperating therewith to define an annular groove, said groove receiving portions of said wall of said bag peripherally bounding said bleed opening in a resilient manner and in fluid sealed relationship, a

cylindrical side wall upstanding from said bottom wall, a pedestal portion upstanding from said bottom wall and disposed concentrically inwardly of said side wall, said bottom and side walls cooperating to define a cavity bounding said pedestal portion and having an open end bounded by a rim portion of said side wall, said rim portion forming an outwardly opening annular shoulder, said pedestal portion defining a valve seat arranged within and normally communicating with said cavity, an inlet passageway extending from said valve seat through said pedestal portion and said bottom wall and said base portion for placing said valve seat in flow communication with said breathing bag when said body is fixed thereto, an outlet passageway extending through said side wall of communication with said cavity, and said actuator is in the



form of a disc shaped diaphragm formed of resiliently deformable material and having a peripherally extending bead snap fitted over said annular shoulder of said rim portion whereby to fix said diaphragm to said side wall for closing said open end of said cavity, said diaphragm tending to assume a rest position spaced from said valve seat and being deformable by application of operator thumb pressure thereto to assume an operative position in engagement with said valve seat, whereby to block flow communication between said cavity and said inlet passageway; and

a flexible tube fixed to said outlet passageway for flow communication with said cavity, said tube being of a length sufficient to exhaust gas passing from said breathing bag through said valve device at a point relatively remote from said bleed opening.

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**4,109,652**

## METHOD FOR REGULATING CHARACTERISTICS OF A GAS STREAM

**Alan L. Gooden, 1214 5th Ave., Neptune, N.J. 07753**

**Filed Apr. 22, 1976, Ser. No. 679,340**
**Int. Cl.² A61M *15/00***
**U.S. Cl. 128—212** **9 Claims**

1. In a process for regulating the characteristics of a gas stream flowing in a system serving a respiratory tract, the steps of:

temperature treating a liquid;

dividing said temperature treated liquid into liquid droplets independently of said gas stream;

introducing said liquid droplets into direct contact with said gas stream while maintaining said droplet introduction and gas stream flow separate and distinct from each other so that any change in one will be independent of the other and (passively with respect to the flow dynamics of the gas stream) so that heat can be exchanged between said gas stream and said droplets when they interface without affecting system pressure or flow;

conducting said gas stream to said respiratory tract after interfacing with said droplets; and

regulating the temperature of said liquid so as to establish and maintain the temperature of said gas stream at a desired level at said respiratory tract.

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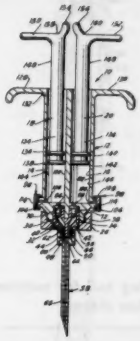
**4,109,653**

## SUCCESSIVE DELIVERY MULTIPLE BARREL SYRINGE

**George Kozam, Tenafly, and Pat Romanelli, Harrington Park, both of N.J.**

**Filed Feb. 22, 1977, Ser. No. 770,741**
**Int. Cl.² A61M *5/00***
**U.S. Cl. 128—218 R** **10 Claims**



1. A successive delivery multiple barrel syringe comprising a body having a plurality of parallel bores, a plurality of individually-depressible plungers extending respectively into said bores, said body having an externally-threaded lower end portion formed with a bottom cavity, a valve body member extending into said cavity and having a plurality of through bores, each communicating with one of the parallel bores of said syringe body, a retainer member having an internally-threaded portion engaging the externally-threaded lower end portion of said syringe body and underlying a portion of said valve body member for releasably clamping the latter in a mounted position within said cavity, said valve body member having a lower body extension projecting below said retainer member and including needle mounting means, a hollow needle mounted on said needle mounting means, the through bores of said valve body member connecting each of the respective bores of said syringe body with said hollow needle, and a plurality of one-way valve means, disposed, one each, in said through bores of said valve body member, and disposed to permit the flow of fluid from each of said parallel bores of said syringe body to said needle and to prevent the flow of fluid in the reverse direction, thereby permitting selective successive depression of said plungers to cause fluids placed in said parallel bores to flow in succession through said needle without mixing of said fluids within said syringe body.

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**4,109,654**

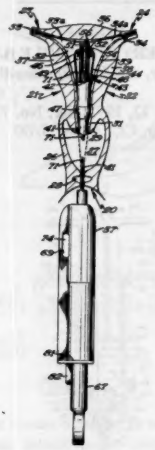
## SINGLE STROKE DISPENSING APPARATUS

**Lee R. Bolduc, St. Petersburg, Fla., and Eugene A. Dickhudt, New Brighton, MN, assignors to Population Research, Inc., Clearwater, Fla.**

**Filed Aug. 10, 1976, Ser. No. 713,294**
**Int. Cl.² A61M *1/00***
**U.S. Cl. 128—235** **20 Claims**

1. In dispensing apparatus for dispensing materials into the Fallopian tubes of a female primate, including means for dispensing materials into the uterine cavity of the female primate, means for expanding within the uterine cavity for moving the dispensed materials from the uterine cavity into the Fallopian tubes, and means for controlling the means for dispensing materials and the means for expanding, improved means for controlling comprising: first drive assembly means for control-

ling the means for expanding; and the first drive assembly means including bias means for limiting maximum pressure of



the means for expanding and for substantially regulating the pressure of the expansion means.

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**4,109,655**

## MULTI-PENETRATION VACCINATION APPARATUS

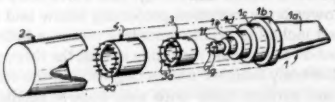
**Georges Chacornac, Saint-Etienne-Loire, France, assignor to Manufacture Francaise d'Armes et Cycles de Saint-Etienne Manufrance, Saint-Etienne-Loire and Institut Pasteur, Paris-Seine, both of, France**

**Filed Oct. 15, 1976, Ser. No. 732,643**

**Claims priority, application France, Oct. 16, 1975, 75 32385; Nov. 10, 1975, 75 35241**

**Int. Cl.[2] A61B *17/20***

**U.S. Cl. 128—253** **30 Claims**



1. Multi-penetrating vaccination apparatus comprising manually engageable mounting means, at least one sleeve comprising means including a plurality of points for penetrating the skin of a patient, said mounting means including a projection with a plurality of points for penetrating the skin of the patient, support means on said mounting means for removable engagement of said sleeve thereon, and means for supplying vaccine to said points with the sleeve engaged on the support means for innoculation of the vaccine into a subject when said points penetrate the skin.

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**4,109,656**

## APPARATUS FOR USE WITH INSUFFLATORS

**James Herbert Goethel, West Chester, and Edwin Lowe Sohngen, Cincinnati, both of Ohio, assignors to Sybron Corporation, Rochester, N.Y.**

**Filed Feb. 7, 1977, Ser. No. 766,256**

**Int. Cl.[2] A61M *13/00***

**U.S. Cl. 128—266** **1 Claim**

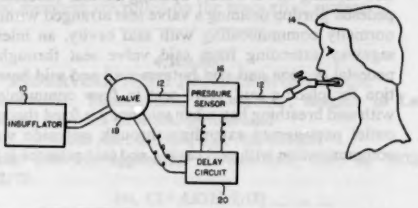
1. Apparatus for use with an insufflator comprised of:

an insufflator having an output;

a breather tube switchably connected to the output of said insufflator and to ambient air;

pressure sensor means arranged in communication with said breather tube so as to transmit a first signal when a patient inhales upon said tube;

delay circuit means being in electrical communication with said sensor and transmitting a second signal a predetermined time after said first signal but during the latter part of said inhalation cycle; and




a diverter valve connected between said breather tube and the output said insufflator and including means in electrical communication with said delay circuit and responsive to said second signal to first connect the patient to ambient air and then, upon receipt of the second signal, to switch the patient to the output of said insufflator.

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**4,109,657**

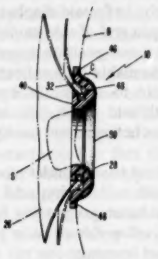
## BODY PROFILED SURGICAL DRAINAGE APPLIANCE

**Russell Settle Carrington, 6804 Atwood St., District Heights, Md. 20028**

**Filed Oct. 19, 1976, Ser. No. 733,921**

**Int. Cl.[2] A61F *5/44***

**U.S. Cl. 128—283** **8 Claims**



1. A body profiled, surgical drainage appliance to be worn by a user, comprising:

a plate member having a body engaging side and a bag supporting side, said member including a central aperture for receiving a stoma extending through a surgically created abdominal opening;

said bag supporting side including a substantially flat surface portion defining a plane and having an annular channel formed therein around said central aperture;

an integral ring member totally recessed into the bag supporting side of said plate member and defining one wall of said annular channel, said ring member having an annular flange for supporting a fecal bag around said stoma, said flange having an outer end parallel to said plane, said outer end of said flange extending toward but not beyond said plane;

said body engaging side of said plate member and the wall of said central aperture being defined by a continuously curved, body engaging surface to accommodate said channel within said plate member, said curved surface being operative to press skin inwardly at the abdominal opening for retaining the stoma in an extended position for drainage of body fluids into said bag, the flange of said ring member extending outwardly from the body of the

user, when worn, within the natural contour of the user's body; and

means for mounting said plate member to the body of the user.

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4,109,658

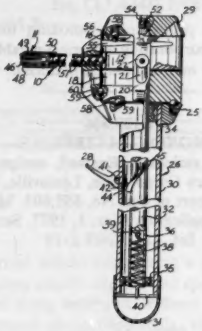
## NEEDLE HOLDING DEVICE WITH PICK-UP MEANS

Joe L. Hughes, 4981 Lake Fjord Pass, Marietta, Ga. 30060

Filed Feb. 4, 1977, Ser. No. 765,447

Int. Cl.[2] A61B *17/06*

U.S. Cl. 128—340 7 Claims



1. A needle holding device comprising a holding means for selectively grasping and releasing a first end of a surgical needle, a pick-up means for selectively grasping and releasing a second end of said needle, said pick-up means being adjacent to and movable towards and away from said holding means, actuating means for selectively moving said pick-up means towards and away from said holding means and camming means for determining when said holding means grasps and releases said first end of said needle and for determining when said pick-up means grasps and releases said second end of said needle, said holding means including a first clamp for receiving said first end of said needle and first operating means extending from said first clamp to said camming means, said pick-up means including a second clamp for receiving said second end of said needle and second operating means extending from second clamp to said camming means, said camming means including a first operating cam means, said first operating means including first cam follower means riding on said first operating cam means, said holding means being so constructed and arranged that, on motion of said first operating cam means, said first cam follower means will activate said first operating means to operate said first clamp, said camming means further including a second operating cam means, said second operating means including second cam follower means riding on said second operating cam means, said pick-up means being so constructed and arranged that, on motion of said second operating cam means, said second cam follower means will activate said second operating means to operate said second clamp.

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4,109,659

## EVAGINATION CATHETERS

David S. Sheridan, Argyle, N.Y., assignor to Mallinckrodt, Inc., St. Louis, Mo.

Filed Jul. 19, 1976, Ser. No. 706,819

Int. Cl.[2] A61M *25/00*

U.S. Cl. 128—349 R 1 Claim

1. In an evagination catheter comprising a substantially rigid tube, a flexible hose shorter in length than said tube, the proximal end of said hose being in fluidtight engagement with the distal end of said tube, said hose being inserted into said tube and structured to be exserted therefrom upon introduction of fluid pressure through the proximal end of said tube, and valve means on the distal end of said hose structured to remain closed when said hose is inserted in said tube and to open when said hose is completely exserted from the tube, the improvement wherein said valve means consists of a port cut through the side wall of said hose adjacent the distal end, the tip of the hose distal of said port being inverted forming a cup-shaped pendant on said hose which is inserted into the hose through said port forming a removable stopper for said port, said improvement being formed by providing a substantially rigid tube open at both ends and a flexible hose shorter in length and smaller in diameter than said tube, said hose having a closed end and an

open end, cutting a port in the side of the hose adjacent said closed end having the tip of the hose's closed end pendant upon the hose, turning said tip inside out forming a cup-shaped pendant on the hose and inserting it into the hose through said port forming a stopper for said port, inserting the stoppered hose into said tube leaving a short section of the open end of said hose external of said tube, folding said short section of hose back over the outside of said tube and forming a fluid-tight connection between said folded back short section of hose and the adjoining outside of said tube.

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4,109,660

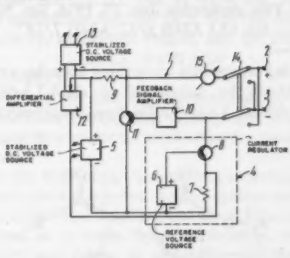
## METHOD OF TOOTH ANESTHETIZING DURING DENTAL TREATMENT AND DEVICE FOR EFFECTING SAME

Nikolai Alexandrovich Nesmeyanov, Inzhenernaya ulitsa, 46, Nalchik; Ivan Alexandrovich Nesmeyanov, ulitsa Kuusinena, 25, kv. 31, Moscow, and Anatoly Alexandrovich Nesmeyanov, Kaluzhsky pereulok, 7, kv. 93, Leningrad, all of U.S.S.R.

Filed Jan. 5, 1977, Ser. No. 756,847

Int. Cl.[2] A61N *1/34*

U.S. Cl. 128—419 R 12 Claims




1. In a device for anesthetizing a tooth in the course of dental treatment, positive and negative terminals adapted respectively to be connected with a dental instrument and a part of a patient's body such as an ear lobe, for providing a given voltage drop in the patient's body, a stabilized d.c. voltage source

having a pair of terminals, and electrical circuit means connecting said terminals of said voltage source respectively to said positive and negative terminals, said circuit means including a current regulator means which includes a transistor having a collector electrically connected to said negative terminal by said circuit means, and said circuit means including a negative feedback circuit means formed in part by said voltage source and connected between the latter and said collector for maintaining a constant current therein.

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**4,109,661**

## FOOTWEAR

**Tatsuo Fukuoka, No. 3-3, 2-chome, Shinminamifukushima, Tokushima-chi, Japan**

**Filed Nov. 3, 1976, Ser. No. 738,579**

**Claims priority, application Japan, Nov. 14, 1975, 50-155738[U]; Nov. 21, 1975, 50-158859[U]; Dec. 25, 1975, 50-177168[U]; Jun. 2, 1976, 51-72358[U]**

**Int. Cl.² A61F *5/14***

**U.S. Cl. 128—582** **21 Claims**

1. An article of footwear including a bottom portion having at least one pressure projection for pressing against a part of the skin surface of the foot of the wearer of the footwear, each said pressure projection comprising a pressure projection body and a pressure core attached in the pressure projection body, said pressure projection body being softer than said projection core, and said projection core being relatively hard and fixed at the upper portion of said pressure projection body.

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**4,109,662**

## FLAVORING COMPOSITIONS CONTAINING ALKYL-2,3-DIHYDRO-3(1'-HYDROXYALKYLIDENE)-2-OXO-5-ALKYL-FURAN-4-CARBOXYLATES

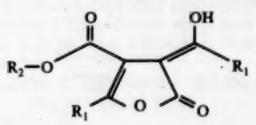
**Brian J. Willis, Bergenfield, N.J.; Frank Fischetti, Jr., Flushing, and Robert G. Eilerman, Hempstead, both of N.Y., assignors to Fritzsche Dodge & Olcott Inc., New York, N.Y.**

**Continuation-in-part of Ser. No. 601,482, Aug. 4, 1975, abandoned. This application Jun. 22, 1976, Ser. No. 698,742**

**Int. Cl.² A24B *3/12;* A24D *1/18***

**U.S. Cl. 131—2** **13 Claims**

1. A smoking compositin comprising a smoking material and at least 0.0001% by weight of an alkyl-2,3-dihydro-3-(1'-hydroxyalkylidene)-2-oxo-5-alkyl-furan-4-carboxylate having the formula:




in which $R_1$ is a straight or branched chain alkyl having less than 6 carbon atoms and $R_2$ is a straight or branched chain alkyl having less than 7 carbon atoms, cyclopentyl or cyclohexyl.

**4,109,663**

## TOBACCO PRODUCT CONTAINING A THERMO-GELABLE β-1,3-GLUCAN-TYPE POLYSACCHARIDE

**Kazuo Maeda, Yokohama; Katuichi Noguchi, Tokyo; Masuo Kawabata, Yokohama; Shigehiko Sato, Tokyo, and Yukio Sato, Ibaraki, all of Japan, assignors to Takeda Chemical Industries, Ltd., Japan**

**Filed Oct. 7, 1975, Ser. No. 620,351**

**Claims priority, application Japan, Oct. 17, 1974, 49-120189; Apr. 30, 1975, 50-52863; Indonesia, Jul. 14, 1975, 5332**

**Int. Cl.² A24D *1/18;* A24B *3/14***

**U.S. Cl. 131—2** **52 Claims**

1. A process for producing a smoking tobacco product, which comprises incorporating a thermo-gelable β-1,3-glucan-type polysaccharide into a smoking material.

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**4,109,664**

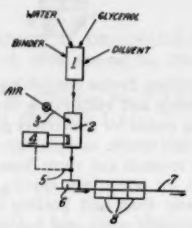
## SMOKING MATERIALS

**Roger W. Hedge, Lymington, England, assignor to Brown & Williamson Tobacco Corporation, Louisville, Ky.**

**Continuation-in-part of Ser. No. 555,603, Mar. 5, 1975, abandoned. This application Mar. 1, 1977, Ser. No. 773,342**

**Int. Cl.² A24D *1/18***

**U.S. Cl. 131—2** **10 Claims**




1. A tobacco substitute, which comprises; a mixture of
(a) a binder which comprises a water-soluble, thermo-gelling, methoxyl-substituted cellulose having a methoxyl degree of substitution of at least 1.5 groups per anhydroglucose unit;
(b) a water-insoluble, inorganic diluent, said binder amounts to 7 to 13% and the diluent to 75 to 85% by weight of the tobacco substitute; and
(c) closed air cells dispersed throughout the mixture of (a) and (b).

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**4,109,665**

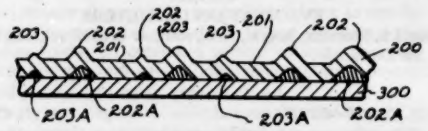
## DECORATED CIGAR WRAPPERS

**Frederick D. Godfrey, Jr., Maplewood, N.J.; John J. Fedro, Wilkes-Barre, Pa., and Robert I. Sinclair, Mendham, N.J., assignors to Consolidated Cigar Corporation, New York, N.Y.**

**Filed Sep. 27, 1976, Ser. No. 727,054**

**Int. Cl.² A24B *3/14;* D21H *5/16***

**U.S. Cl. 131—15 C** **44 Claims**




1. A sheet of manufactured cigar wrapper material having opposed surfaces and a pre-determined cross-sectional thickness, said wrapper having a vein-like pattern embossed through said cross-sectional thickness to form a raised vein-like pattern on one of said opposed surfaces and a complimentary

depressed vein-like pattern on said opposite surface, wherein the depressed pattern on said opposed surface is filled with a filler material in order to reinforce said embossed pattern.

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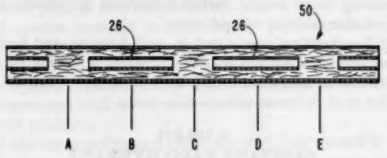
**4,109,666**

## CIGARETTE FILTER

**Vello Norman, Raleigh, and Charles M. Moogalian, Durham, both of N.C., assignors to Ligett Group Inc., Durham, N.C.**

**Filed Mar. 1, 1976, Ser. No. 662,624**
**Int. Cl.² A24D 1/04**
**U.S. Cl. 131—261 B** **1 Claim**




1. A cylindrical article comprising a plurality of tubes of equal length being axially aligned and spaced apart given and equal distances along said axis, a layer of compacted filter material positioned circumferentially about said tubes and extending the length of said cylindrical article, said filter material frictionally holding said tubes in position along said axis and said filter material being compacted to a state of greater density in the area surrounding said tubes and to a state of lesser density in the area extending between said tubes and a cylinder of plug wrap material about said layer of filter material for maintaining said filter material in its relative density states.

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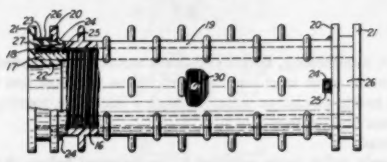
**4,109,667**

## HAIR SETTING ROLLER

**Virgil P. Quirk, St. Marys, Pa., assignor to Stackpole Carbon Company, St. Marys, Pa.**

**Filed Nov. 8, 1976, Ser. No. 739,550**
**Int. Cl.² A45D 2/12**
**U.S. Cl. 132—33 R** **8 Claims**



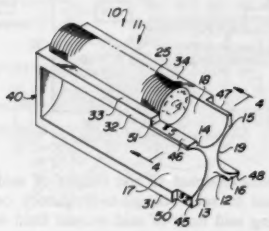
1. In a hair setting roller for use with apparatus having a pair of laterally spaced electric supply contacts and a permanent magnet between them, a dielectric cylinder, an electrical resistance magnetic heating element encircling the cylinder and secured thereto and adapted to be attracted by said magnet, and circular electric contacts electrically connected to the ends of said element, said contacts encircling the opposite ends of said cylinder in spaced relation with said element for engaging said supply contacts while said magnet overcomes a force tending to separate said roller and magnet, whereby to heat said element electrically, said resistance heating element having a magnetic permeability that decreases as its temperature increases until the attraction of the magnet and said element for each other becomes weaker than said separating force acting on the roller.

**4,109,668**

## COIN COUNTER

**Joseph J. Malacheski, 130 E. Division St., Wilkes-Barre, Pa. 18702**

**Continuation of Ser. No. 639,360, Dec. 10, 1975, abandoned.**
**This application May 26, 1977, Ser. No. 800,652**
**Int. Cl.² G07D 9/02**
**U.S. Cl. 133—8 R** **4 Claims**



1. A coin counter comprising an elongate body of generally polygonal cross-sectional outline for resting on a selected side and having a plurality of grooves extending longitudinally of said body for respectively receiving stacks of coins, each of said grooves being located laterally within and substantially occupying a respective side of said body, said grooves extending into said body toward each other and terminating short of each other to leave of the body material a central longitudinally extending spine and a plurality of longitudinally extending ribs outstanding from said spine toward and terminating at respective corners of said body, an end member at one end of each groove adjacent to one end of said body for abutting engagement with a stack of coins received in the respective groove, and indicia associated with each groove at a predetermined distance from the respective end member to indicate a desired quantity of coins in the respective groove, said grooves each extending beyond the associated indicia and opening through the body end opposite to said one body end for supporting a wrapper in position to engage about coins in the respective groove, and said indicia being defined by a cut formed in each rib facing generally outwardly in the same direction as the associated groove and extending chordally of the associated groove entirely through the respective rib for tactile sensing.

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**4,109,669**

## ELECTRONIC FUEL INJECTION SYSTEM FOR INTERNAL COMBUSTION ENGINES

**Jean Pierre Rivere, Paris, France, assignor to Regie Nationale des Usines Renault and Societe dite Automobiles Peugeot, both of Boulogne-Billancourt, France**

**Division of Ser. No. 435,211, Jan. 21, 1974, Pat. No. 3,949,713.**
**This application Apr. 30, 1975, Ser. No. 572,945**
**Claims priority, application France, Jan. 19, 1973, 73.01898**
**Int. Cl.² F02B 3/00**
**U.S. Cl. 137—101.19** **5 Claims**

1. A servo loop for assuring a proportionality between the flow of a first fluid and the flow of a second fluid, comrising:

a differential flow meter for measuring the mass flow of said first fluid,

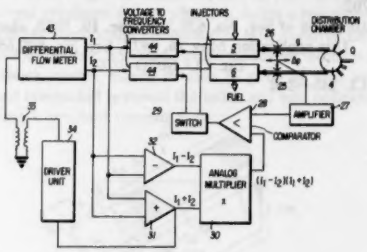
a path for the flow of the second fluid including a supply, a first inlet control injector, a fluid system using at least a portion of the flow supplied, and an outlet control injector connected in a series flow relationship, said injectors coupled to and driven by said differential flow meter;

a pair of voltage-to-frequency converters coupled between said differential flow meter and said injectors for driving said injectors;

a differential pressure sensor coupled between said injectors for sensing differences in pressure therebetween,

comparator means coupled to said differential flow meter

and to said differential pressure sensor for comparing the outputs thereof; and




control means coupled to the output of said comparator means and to said voltage-to-frequency converters for controlling said flow of said second fluid in response to the output of said comparator means.

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**4,109,670**

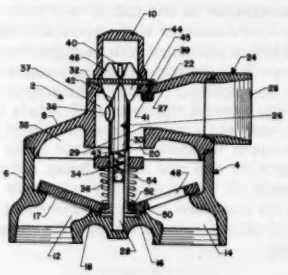
## COMBINATION CHECK FLOW CONTROL AND SELECTOR VALVE

**Roger D. Slagel, Plantation, Fla.**

**Continuation of Ser. No. 360,685, May 16, 1973, abandoned, which is a continuation-in-part of Ser. No. 196,486, Nov. 8, 1971, abandoned. This application Jan. 13, 1975, Ser. No. 540,492**

**Int. Cl.[2] F16K *21/00***

**U.S. Cl. 137—119** **9 Claims**



1. A multi-port sequencing valve comprising:

a housing having a central fluid receiving chamber, a chamber inlet, a housing inlet in fluid communication with said chamber inlet of said chamber, and a plurality of outlets disposed substantially on the side opposite of said central chamber from said chamber inlet, said outlets having a surrounding inner surface substantially concave in shape;

a sequencing outlet sealing valve means having at least one aperture disposed therethrough and a sealing surface for contact with said inner surface of said housing,

said outlet sealing valve means having a lower sloping engaging surface for engagement with said outlet surface to close at least some of said outlets, said lower sloping engaging surface of said outlet sealing valve means having a slope less than said surrounding inner surface of said housing to provide initial opening of said outlet sealing valve means in a non-fluid flow condition,

a stem means connected to said housing;

said stem means including a reciprocally movable portion with one end connected to the central portion of said outlet sealing valve means, said movable portion positioned centrally said housing;

a control valve means connected to said movable portion of said stem means and positioned on said movable portion to move into said chamber inlet to provide a barrier to fluid within said chamber inlet from passing out through said chamber inlet;

a biasing means connected to said movable portion of said stem means for rotating normally opening said outlet sealing valve means and positioning said control valve means within said chamber inlet when fluid stops flowing through said chamber inlet into said chamber, fluid flow through said housing moves said control valve means out of said chamber inlet and said outlet sealing valve means into sealing engagement with said inner surface of said housing,

a cam means connected to said stem;

said cam means including a first portion connected to said housing and a second cam portion connected to said stem for engagement with said first portion to rotate said outlet sealing valve means during reciprocal movement of said movable portion of said stem;

said first portion connected to said housing and being removably connected to said housing whereby said first portion of said cam means may be easily replaced.

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**4,109,671**

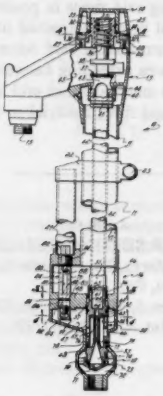
## SANITARY YARD HYDRANT

**James L. Hughes, and William E. Broerman, both of Cincinnati, Ohio, assignors to Industrial Value Analysis Inc., Cincinnati, Ohio**

**Filed May 3, 1976, Ser. No. 682,497**

**Int. Cl.[2] E03B *9/14***

**U.S. Cl. 137—282** **9 Claims**



1. A nonfreezing, sanitary hydrant mechanism adapted to be connected to an inlet line disposed below the frost line of the earth and to discharge water through a discharge opening, said hydrant comprising:

a head;

a main valve body adapted to be disposed below the frost line, and having an upper and a lower chamber formed therein;

a transverse wall dividing said upper and lower chambers and having two openings formed therein;

a stand pipe extending upwardly from said main valve body and interconnecting the head and said upper chamber of the main valve body;

means for connecting the valve body to the inlet line;

a flow tube disposed within said stand pipe and being in fluid communication with said discharge opening through said head;

the lower portions of said flow tube and stand pipe and the interior of said valve body chambers providing a receptacle for storing below frost line water drained from said head and the upper portion of said flow tube;

an ejector member passing through one opening in said

transverse wall and including a peripheral wall, a venturi tube mounted within said peripheral wall in spaced relationship thereto, said peripheral wall having openings extending therethrough;

said ejector member being in fluid communication with said flow tube;

said ejector member including flow control means;

said ejector member being movable between first and second positions;

said ejector member in said first position causing said flow control means to seal off said inlet line;

said transverse openings in said ejector wall being disposed in fluid communication with said lower chamber, whereby fluid is free to drain from said head and flow tube into said lower chamber and into the lower portion of said stand pipe in the first position;

said ejector member in said second position causing said flow control means to open said inlet line for flow through said venturi and flow tube to said discharge opening;

said ejector member being in sealed engagement with said transverse wall when said ejector member is in said second position;

said ejector member and flow tube defining a conduit structure through said upper chamber in fluid communication with said head in the second position;

said ejector member in said second position further causing said peripheral wall openings to be disposed in the lower portion of the valve body chamber to connect the interior of said valve body to said venturi, whereby water stored in the main valve body and said stand pipe is ejected from said hydrant;

float and check valve means for controlling flow through said second opening in said transverse wall;

and actuating means for selectively shifting said ejector from one of said positions to the other.

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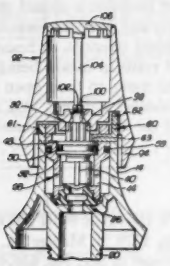
**4,109,672**

## SNAP-IN VALVE CARTRIDGE

**Robert S. Szemeredi, Sunland, Calif., assignor to Price-Pfister Brass Mfg. Co., Pacoima, Calif.**

**Filed Jul. 29, 1977, Ser. No. 820,396**
**Int. Cl.² F16K *3/10***
**U.S. Cl. 137—315** **16 Claims**



2. In a plumbing fixture:

a. a valve body having a cup providing a valve recess;

b. a valve mechanism in the recess including a non-rising valve stem projecting upwardly of the recess;

c. a hollow handle for operating the valve stem and having a skirt encompassing the valve body cup;

d. companion axially separable snap coupling members carried respectively at the end of the stem and on the inside of said handle, one of said coupling members being movable radially upon axial separation there between; and

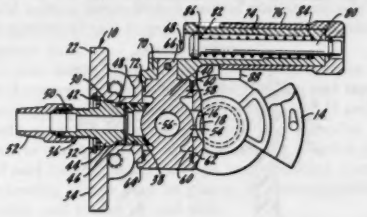
e. a dog member releasably mounted at the top of said handle and having a part positioned to restrict radial movement of said one of said coupling members whereby said stem and said handle are secured together for conjoint angular movement.

**4,109,673**

## COMBINATION GLADHAND AND SHUTOFF COCK

**Charles Horowitz, Niles, and Frederic Lissau, Chicago, both of Ill., assignors to Sloan Valve Company, Chicago, Ill.**

**Filed Aug. 23, 1976, Ser. No. 716,378**
**Int. Cl.² F16K *27/08*; F16L *35/00***
**U.S. Cl. 137—381** **1 Claim**



1. In a combination gladhand and shutoff cock, a gladhand body having an air inlet and an air outlet, a flow passage through said body connecting said inlet and outlet,

a valve chamber in said body in fluid communication with said flow passage and a rotatable valve member positioned in said valve chamber for controlling flow through said passage, a tubular member for rotating said valve member attached to one end thereof,

a latch member slidably mounted on said tubular member, said latch member comprising a generally cylindrical hollow body portion, a gripping portion adjacent to one end of said latch member body portion, a cover portion extending from said latch member body portion and positioned to seat upon and to close said air outlet when said rotatable valve member closes said air passage, and a latching portion on said latch member movable between latched and unlatched positions, said latching portion of said latch member cooperating with said gladhand body when in the latched position to prevent rotation of said latch member and said rotatable valve member when said rotatable valve member is in a closed position,

a rod axially positioned within said tubular member, said rod having an increased diameter head at one end, with the other end of said rod extending into and being attached to said latch member,

a spring positioned on said rod, said spring normally biasing said latching portion of said latch member to said latching position.

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**4,109,674**

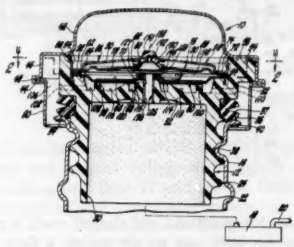
## PRESSURE AND VACUUM RELIEF VALVE ASSEMBLY

**David A. Beale, Huron, Ohio, assignor to General Motors Corporation, Detroit, Mich.**

**Filed May 25, 1977, Ser. No. 800,198**
**Int. Cl.² F16K *17/26***
**U.S. Cl. 137—493.9** **2 Claims**

1. A pressure and vacuum relief valve assembly for a liquid container comprising means including a vacuum diaphragm and a wall cooperatively providing a vacuum relief chamber, a vent passage communicating said vacuum relief chamber with atmosphere, means including a pressure diaphragm exposed on an atmospheric side to atmosphere and cooperating on an opposite pressure side with said vacuum diaphragm to provide a control chamber, said diaphragms each having an aperture therein, a pressure vent passage for communicating said control chamber with the interior of a container through the aperture in said vacuum diaphragm, said vacuum diaphragm normally sealingly engaging about the aperture therein with said wall and operable to disengage therefrom to provide for communication between said vacuum relief chamber and the interior of the container only upon a predetermined reduction in pressure in the container below atmospheric pressure, means

including a valve seal element extending through the aperture of said pressure diaphragm, said valve seal element having first and second valve seal means on the respective pressure and atmospheric sides of said pressure diaphragm, said pressure diaphragm normally sealingly engaging about the aperture therein with said first valve seal means and operable to disengage therefrom to provide for communication between atmosphere and said control chamber only upon a pressure increase in the container to a predetermined value above atmospheric



pressure, and said second valve seal means arranged relative to said first valve seal means so as to be sealingly engaged by second pressure diaphragm about the aperture therein to prevent any communication between said control chamber and atmosphere upon the occurrence of a pressure surge in said control chamber exceeding said predetermined value above atmospheric pressure whereby leakage from the container through said aperture in said pressure diaphragm is positively prevented.

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**4,109,675**

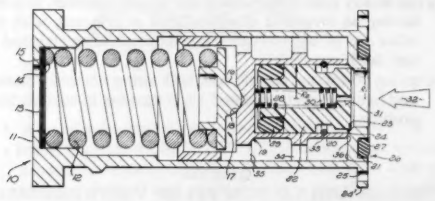
## RELIEF VALVE

**Ali Acar, Los Angeles, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.**

**Filed Apr. 15, 1977, Ser. No. 787,955**

**Int. Cl.² F16K *17/04***

**U.S. Cl. 137—494** **8 Claims**



1. A fluid flow control device, said device comprising: a barrel having a cylindrical internal surface; a hollow, cylindrical poppet guided for reciprocation independent of rotation inside said barrel, said barrel having an annular inwardly extending flange at one end thereof, said poppet having a closed end and an open end movable to abut said flange, said poppet being adapted to provide a path for the fluid flow from inside thereof between said open end thereof and said flange, and around the exterior thereof but inside said barrel axially toward said closed end, said flange having a hole therethrough to allow fluid under pressure to enter said poppet through said flange hole, said poppet open end being larger than and adapted to close off said flange hole, said flange hole having a beveled interior surface; a cylinder slidable inside said poppet, said cylinder having an annular corner movable into and out of sealing engagement with said surface; an auxiliary spring mounted on said poppet to bias said corner against said surface, said cylinder having an unbalanced force radius at said corner somewhat less than that where said cylinder slides against the interior of said poppet; spring means to bias said poppet open end into abutment with said flange; and a lost motion connection between said poppet and said cylinder.

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**4,109,676**

## FILTERS

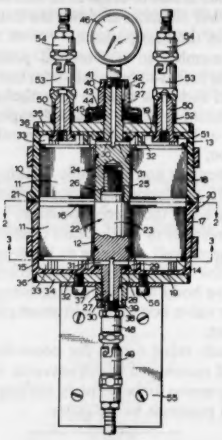
**Ernest James Price, Solihull, England, assignor to E. J. Price (Developments) Limited, Birmingham, England**

**Filed Dec. 14, 1976, Ser. No. 750,452**

**Claims priority, application United Kingdom, Dec. 17, 1975, 51546/75**

**Int. Cl.² F16K *45/02***

**U.S. Cl. 137—550** **12 Claims**



1. A casing for a filter comprising at least two relatively movable body portions which together define a chamber for receiving filter means, said chamber having fluid inlet and outlet means arranged that when filter means is received within the chamber fluid passing there through from the inlet to the outlet means is constrained to pass through the filter means, said body portions being relatively movable with respect to each other between a closed position wherein said chamber is fluid-tight and an open position, and resilient means operative on said body portions to resist relative movement there between, said resilient means being yieldable to permit the body portions to move to their open position and fluid to escape from said chamber between said body portions wherever the pressure of the fluid in the chamber exceeds a predetermined value.

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**4,109,677**

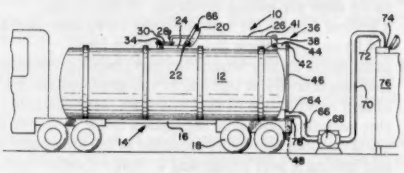
## PROTECTIVE DEVICE FOR STORAGE TANKS

**Richard E. Burnside, 1020 N. Mayler St., Marengo, Ill. 60152**

**Continuation-in-part of Ser. No. 636,411, Dec. 1, 1975, abandoned. This application Sep. 16, 1976, Ser. No. 723,962**

**Int. Cl.² F16K *45/00***

**U.S. Cl. 137—586** **3 Claims**



1. In combination, a mobile, liquid containing tank having a vent unit situated generally atop said tank, a cover member

disposed over said vent unit and adapted to be moved between a closed position covering said vent unit and an open position permitted access to said vent unit, a drain opening disposed generally at the bottom of said tank, said opening being adapted to accept a connection to a drain conduit, a guard unit for said drain opening and a guard unit guide means mounting said guard unit for free but limited movement between a first guard position blocking the connection of said conduit to said drain opening and a second position permitting said connection, a movable guard unlocking member mounted on said tank, said guard unlocking member having one portion pivotally attached to said tank, another portion adapted for engagement with said cover member when said cover member is closed, said cover-engaging portion being free to move to another position when said cover member is open, a free end portion for connection to said guard unit, and means connecting said guard unit and said guard unlocking member, said connecting means including a rigid rod member and a pivotally mounted rocker, said rod member being attached at one end thereof to said free end portion of said guard unlocking member and at the other end thereof to one arm of said rocker, and means attaching the other arm of said rocker to a portion of said guard unit, whereby said guard unit is held in said first position by engagement between said portion of said guard unlocking member and said cover when said cover member is closed, and whereby, when said cover member is opened, said guard unlocking member is free to move so that said guard unit is freely movable to said second position.

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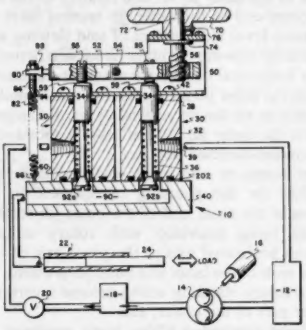
**4,109,678**

## FLUID CONTROL VALVE ASSEMBLY

**Leonard Chapman, 13760 Chandler Blvd., Van Nuys, Calif. 91401**

**Filed Feb. 25, 1977, Ser. No. 771,961**
**Int. Cl.² F15B *13/04***
**U.S. Cl. 137—596.2** **9 Claims**



1. A control valve assembly for controlling the admission and
discharge of fluid to, and from, fluid-powered actuator means,
comprising:
a pair of identical control valves, with each of said valves including a cylindrical bore passing through a valve body, a cylindrical tappet reciprocable in one end of said bore and protruding therefrom, sealing means between said bore and said tappet to prevent egress of fluid from the bore, a valve seat provided with a circular channel coaxial with said bore inset into the other end of the bore, a conical valve head removably secured to said tappet by means of an elongated valve stem, and resilient spring means entrapped in said bore between said tappet and said valve seat for urging said valve head into fluid-sealing contact with said channel;
fluid manifold means in communication with said other end of the bore of each of said pair of control valves said fluid manifold means having an inlet/outlet means for communicating with a fluid-powered actuator means;
fastener means, for securing said pair of control valves to a surface of said manifold means;
valve actuating means, including a carrier member secured to at least one of said valve bodies, a rocking beam pivotably secured to said carrier member and superimposed above the protruding portions of said tappets in said valves, and operating means for controllable pivoting of said rocking beam from a neutral position equally spaced from both of said tappets into bearing contact with either tappet; and
fluid port means communicating with said bore in each of said control valves, intermediate between said tappet and said valve seat, adapted to interconnect one of said valves with a source of pressurized fluid and the other of said valves with a sink for fluid, whereby, by selective pivoting of said rocking beam through said operating means, said actuating means may be placed in communication with either said source or said sink.

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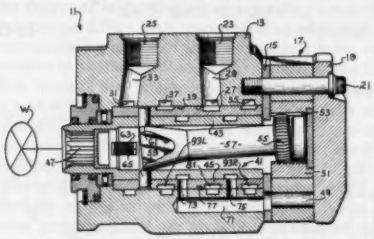
**4,109,679**

## CONTROLLER FOR FLUID PRESSURE OPERATED DEVICES

**Oliver Wendell Johnson, Chaska, Minn., assignor to Eaton Corporation, Cleveland, Ohio**

**Continuation-in-part of Ser. No. 679,607, Apr. 23, 1976, Pat. No. 4,033,377, which is a continuation of Ser. No. 507,015, Sep. 18, 1974, abandoned. This application Jan. 24, 1977, Ser. No. 761,832**
**The portion of the term of this patent subsequent to Jul. 5, 1994, has been disclaimed.**
**Int. Cl.² B62D *5/08***
**U.S. Cl. 137—596.13** **18 Claims**



16. Valve means for use in a controller of the type including a housing defining an inlet port, a supply passage communicating therewith, an outlet port, first and second control fluid ports and first and second control fluid passages communicating therewith, respectively, a fluid meter including a metering member movable to measure the volume of fluid passing therethrough, first and second fluid meter passages communicating with said fluid meter means, means operatively associated with said metering member to impart follow-up movement to said valve means in response to movement of said metering member, said valve means defining an axis of rotation and a central reference plane disposed perpendicular to said axis, said valve means comprising:
(a) a primary valve member defining first and second annular meter grooves and first and second axial pressure passages communicating with said first and second meter grooves, respectively;
(b) a follow-up valve member disposed about said primary valve member, defining a neutral position relative thereto and defining pressure port means adapted to communicate with said supply passage and disposed adjacent said central reference plane;
(c) said first axial pressure passage extending a sufficient

distance to communicate with said pressure port means when said valve members are relatively displaced in one direction from said neutral position, said second axial pressure passage extending a sufficient distance to communicate with said pressure port means when said valve members are relatively displaced in the other direction from the neutral position;

(d) said follow-up valve member defining first and second meter ports disposed to be in continuous fluid communication with said first and second meter grooves, respectively, and adapted to be in commutating fluid communication with said first and second fluid meter passages, respectively;

(e) said follow-up valve member further defining first and second operating ports oppositely and approximately equally disposed about said central reference plane and adapted to be in continuous fluid communication with said first and second control fluid passages, respectively; and

(f) said primary valve member defines a first axial operating passage communicating with said first meter groove and being disposed to communicate with said first operating port when said valve members are relatively displaced in said other direction, and a second axial operating passage communicating with said second meter groove and being disposed to communicate with said second operating port when said valve members are relatively displaced in said one direction.

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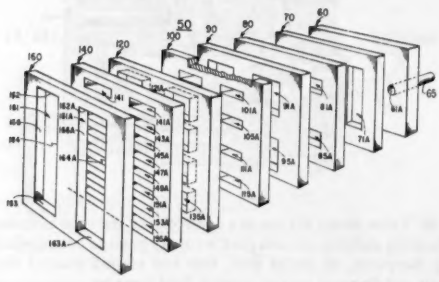
**4,109,680**

## PLATE TYPE FLUID DISTRIBUTING DEVICE

**Ardis R. Lavender, 6 Starlight Dr., Clarks Summit, Pa. 18411**

**Filed Jan. 3, 1977, Ser. No. 756,094**
**Int. Cl.² F16L *55/02***
**U.S. Cl. 137—599** **13 Claims**



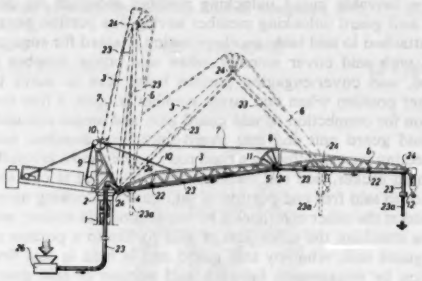
1. A device for distributing fluid comprising a series of plates in stack configuration, one outermost plate in said stack of plates having an aperture therein defining an inlet, the other outermost plate in said stack of plates having an aperture therein defining an outlet, each intermediate plate having an aperture therein in fluid communication with apertures in abutting plates in said stack such that the fluid flow subdivides into a plurality of fluid flow paths between said inlet and outlet, a first set of alternate plates in said stack wherein each plate in the set has the same number of apertures as the preceding plate in the stack with the total area of the apertures being substantially increased compared to the total area of the apertures in the preceding plate in the stack, a second set of alternate plates in said stack wherein each plate in the set has twice the number of apertures as the preceding plate in the stack, whereby fluid from said inlet subdivides into a plurality of fluid flow paths to distribute fluid at said outlet evenly.

**4,109,681**

## HOISTING CRANE FOR BUILDING PURPOSES

**John Edvard Lennart Stahl, Bromma, Sweden, assignor to Tornborg & Lundberg AB, Bristagatan, Sweden**

**Continuation of Ser. No. 467,361, May 6, 1974, abandoned. This application Mar. 22, 1976, Ser. No. 669,080**
**Int. Cl.² B67D *5/00***
**U.S. Cl. 137—615** **1 Claim**



1. A hoisting crane for building purposes, comprising

(a) a tower,

(b) an inner jib section pivotably mounted in the region of the top of the tower,

(c) an outer jib section having roughly the same length as the inner jib section and being pivotably mounted at the outer end of the inner jib section,

(d) a bow-shaped guide means for a control rope running between the inner end of the outer jib section and the broach of the tower, said control rope being adapted to steer the angular position of the outer jib section relative to the inner jib section in correspondence to the slewing angle of the inner jib section relative to the tower so that the outer end of the outer jib section takes substantially the same level independent of said slewing angle,

(e) means for slewing the inner jib section between a substantially horizontal or slightly upwards directed position, in which the outer jib section takes a substantially horizontal position to an almost vertical upward-directed position in which the outer jib section takes a substantially vertical downward-directed position,

(f) pipe means on said tower and said inner and outer jib sections for the pumping of concrete to a portioning means at the outer end of the outer jib section, said pipe means being provided with rotary couplings acting around horizontal axis at the pivot axis of the inner and outer ends of the inner and outer jib sections, respectively, and a rotary coupling acting around a vertical axis in the upper part of the tower, and

(g) a hoist controlled lifting hook mounted adjacent the outer end of said outer jib.

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**4,109,682**

## DIRECTIONAL CONTROL VALVE

**Ellidi N. Gudjonsson, Lindarflot 37, Gardabaer, Iceland**

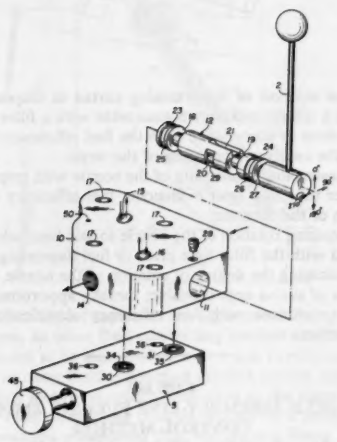
**Filed Jan. 31, 1977, Ser. No. 764,080**
**Int. Cl.² F15B *13/04***
**U.S. Cl. 137—625.23** **11 Claims**

1. A valve comprising:

a valve body (10) having a valve bore (11) therein, a first port (13) for receiving a pressure fluid, a second port (14) for discharging pressure fluid, and third and fourth ports (15, 16) for connection to an output utilization device, said first, second, third and fourth ports (13–16) all being in communication with said valve bore (11); and

an elongated generally rod-shaped valve spool (12) rotatably received in said valve bore (11), said valve spool having a first circumferential recess (18) which is in communication with said third port (15); a second circumferential recess

(19) spaced from said first circumferential recess (18) and in communication with said fourth port (16); a through bore (20) located between said first and second circumferential recesses and at a given axial position of said valve spool such that it is in selective communication with said first and second ports (13, 14); a first straight groove (22) which is in selective communication with said first port (13) and which extends axially of said valve spool (12) from at least said given axial position of said valve spool to said first circumferential recess (18); a second straight groove (21) which is in selective communication with said first port (13) and which extends axially of said valve spool (12) from at least said given axial position of said valve spool to said second circumferential recess (19), said first and second grooves (22, 21) being on diametrically opposite sides of said valve spool and said through bore (20) having an axis which is substantially perpendicular to the longitudinal axis of said valve spool, said axis of said



through bore (20) being substantially perpendicular to a plane passing through said first and second grooves; and a further groove (29) in said valve spool at each end of said through bore (20), said further grooves being substantially perpendicular to said first and second grooves (22, 21) and out of communication with said first and second grooves, the angular communication of said through bore (20) with said first and second ports (13, 14) being greater than that of said first and second grooves (22, 21); and

means for rotating said valve spool (12) in said valve bore (11) whereby when said through bore (20) of said valve spool is in full communication with said first and second ports (13, 14), the output utilization device is shunted and rendered in the off condition, when said first groove (22) is in full communication with said first port (14), the output utilization device is operated at maximum in a first direction and when said second groove (21) is in full communication with said first port the output utilization device is operated at maximum in an opposite direction.

**4,109,683**

## THROTTLE VALVE

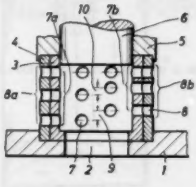
**Wilhelm Strache, Bremen, Fed. Rep. of Germany, assignor to Gestra-KSB Vertriebsgesellschaft, Bremen, Fed. Rep. of Germany**

**Filed Nov. 24, 1976, Ser. No. 744,550**

**Claims priority, application Fed. Rep. of Germany, Dec. 11, 1975, 2555752**

**Int. Cl.[2] F16K *47/14*; F15D *1/14***

**U.S. Cl. 137—625.3** **9 Claims**




1. A throttle valve, comprising:

a throttle member including at least two telescopically and coaxially disposed, substantially cylindrical jackets, each of said jackets having an equivalent number of groups of radially-extending throughflow bores distributed over at least a portion of the circumference thereof, the bores in each group being spaced apart from one another such that their axes lie in spaced apart planes normal to the longitudinal axes of said jackets, at least the axes of some of the bores of one group being offset relative to the axes of corresponding bores of an other group in a longitudinal axial direction of said jackets up to a maximum distance equivalent to the cross-section dimensions of said bores, the degree of said offset of corresponding bores of different groups differs from corresponding planes of axes to corresponding planes of axes, said jackets being rotatable relative to another so that, in a first position, the throughflow bores of said one group and said other group of one of said jackets are, respectively, at least partially alignable with the throughflow bores of said one group and said other group of the other of said jackets and, in a second position, the throughflow bores of said one group and said other group of one of said jackets are, respectively, at least partially alignable with the throughflow bores of said other group and said one group of the other of said jackets; and

a slide-locking portion coaxially disposed relative to said jackets, at least one of said locking portion and said throttle member being longitudinally axially displaceable to permit relative movement therebetween so as to permit opening and closing of said bores.

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**4,109,684**

## METHOD AND APPARATUS FOR REPAIRING LEAKS IN WATER HEATERS

**Robert R. Fernandez, 221 W. 57th St., B-85, Loveland, Colo. 80537**

**Filed Apr. 14, 1977, Ser. No. 787,508**

**Int. Cl.[2] F16L *55/18***

**U.S. Cl. 138—97** **3 Claims**

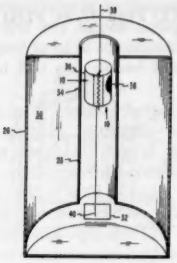
1. Apparatus for repairing a leak in a length of pipe, the apparatus comprising:

a sealant-coated, generally cylindrical metallic repair section having a spring temper characteristic and being formed to include a first longitudinal edge and a second longitudinal edge that overlaps the first longitudinal edge;

a pair of mating lacing members attached to the outer surface of said repair section, one of said pair of mating lacing members being attached along said second longitudinal edge and the other one of said pair of mating lacing members being attached a predetermined distance away from

said first longitudinal edge such that said repair section is in a compressed cylindrical position when said mating lacing members are in a laced position;

a lacing pin securing the mating lacing members in said laced position, thereby maintaining the repair section in the compressed cylindrical position; and



means for removing said lacing pin after the repair section has been coaxially positioned inside the length of pipe adjacent the leak, whereupon the repair section is permitted to spring to an expanded cylindrical position, thereby exerting a force against the inside surface of the pipe to form a permanent sealant layer in the area of the leak to effect repair thereof.

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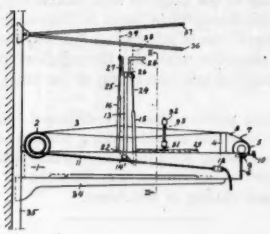
**4,109,685**

## HORIZONTAL HAND WEAVING LOOM

**J. Ollie Westin, Sjovagen 7, S-183 52 Taby, Sweden**

**Filed Dec. 2, 1975, Ser. No. 636,838**
**Claims priority, application Sweden, Dec. 4, 1974, 7415035**
**Int. Cl.[2] D03D *29/00***
**U.S. Cl. 139—33** **7 Claims**



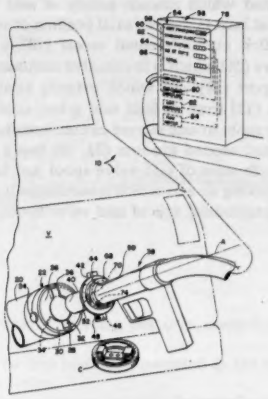
1. A horizontal hand weaving loom mountable on horizontal supports comprising a horizontal basic frame in which a warp beam and a cloth beam are rotatably mounted; a lineraly displaced beater with reed; a support frame projecting above the basic frame connected to the basic frame and carried by a horizontal shaft, said support frame being positioned between the warp beam and the cloth beam; a manually operable means mounted on the support frame which is connected by a link means to each one of at least two harnesses, said harnesses being positioned adjacent the support frame, said operable means adapted for raising and lowering the harnesses, the bottom portions of said harnesses being directly connected by hinge means to a rocker arm, said rocker arm being pivotably mounted about said horizontal carrying shaft in the support frame and connected to said at least two harnesses to operate said harnesses, said harnesses hinging freely between said manually operable means and each said rocker arm.

**4,109,686**

## TAX ADJUSTING VEHICLE GASOLINE FILLER EQUIPMENT

**Jacque R. Phillips, 835 Fountain Ave., Lancaster, Pa. 17601**

**Filed Jul. 6, 1977, Ser. No. 813,350**
**Int. Cl.[2] B65B *3/04***
**U.S. Cl. 141—1** **6 Claims**



1. The method of apportioning surtax in dispensing fuel through a nozzle rotatably associatable with a filler tube in a fuel receiver in accordance with the fuel efficiency classification of the receiver, consisting of the steps:

(a) constraining rotatability of the nozzle with respect to the filler tube to a limit evidencing fuel efficiency classification of the receiver;

(b) requiring rotation of the nozzle to said limit when associated with the filler tube prior to fuel dispensing; and

(c) indicating the degree of rotation of the nozzle, as a measure of surtax apportionable; thereby apportioning surtax in accordance with fuel efficiency classification of the receiver.

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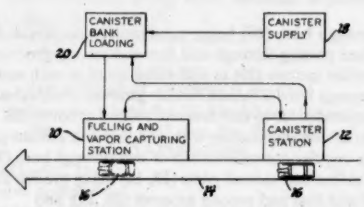
**4,109,687**

## VEHICLE ASSEMBLY-LINE FUELING EMISSION CONTROL METHOD

**Jack B. King, Royal Oak, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Mar. 24, 1977, Ser. No. 780,600**
**Int. Cl.[2] B65B *31/00***
**U.S. Cl. 141—5** **2 Claims**




1. A method of capturing vapor displaced from fuel tanks in vehicles during fueling on a vehicle assembly line comprising the steps of

(1) delivering fuel to the fuel tanks and collecting the vapor-air mixture displaced from the fuel tanks during fuel delivery thereto,

(2) delivering the collected vapor-air mixture to a plurality of parallel arranged fuel vapor adsorbing devices destined for usage in fuel vapor collecting systems in vehicles,

(3) replacing the fuel vapor adsorbing devices used in step (2) with fresh such devices prior to their reaching their full fuel vapor storage capacity, and

(4) installing the fuel vapor adsorbing devices replaced in step (3) in assembly line vehicles prior to delivering fuel to the fuel tanks thereof.

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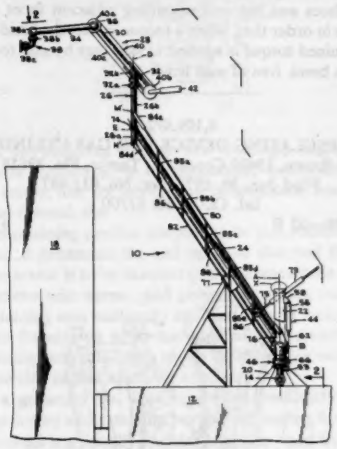
**4,109,688**

## ATTITUDE MAINTAINING MECHANISM FOR A MARINE LOADING ARM

**Neal E. Jameson, Orange, Calif., assignor to FMC Corporation, San Jose, Calif.**

**Filed Aug. 8, 1977, Ser. No. 822,977**
**Int. Cl.[2] B65B 3/04**
**U.S. Cl. 141—387** **9 Claims**



1. In fluid transport apparatus having means defining mounting structure, an inner fluid conducting conduit section pivotally connected at its inner end on a first axis to said mounting structure, an outer fluid conducting conduit section, said outer fluid conduit section pivotally connected to the outer end of said inner fluid conducting conduit section on a second axis, the improvement comprising first and second linear control members parallel to said inner fluid conducting conduit section, means pivotally connecting the inner ends of said control members to said mounting structure on opposite sides, respectively, of said first axis, and means pivotally connecting the outer ends of said control members to said outer fluid conducting conduit section on opposite sides, respectively, of said second axis.

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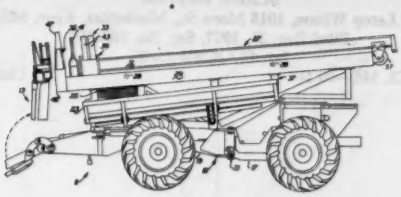
**4,109,689**

## APPARATUS FOR PROCESSING TREES

**Donald G. Castine, Eggertsville, N.Y., assignor to Eaton Yale Ltd., Woodstock, Canada**

**Filed Jun. 16, 1977, Ser. No. 806,968**
**Int. Cl.[2] B27L 1/00**
**U.S. Cl. 144—2 Z** **14 Claims**

1. In apparatus for processing trees, a processing boom assembly comprising a first stationary elongated boom member; a second elongated boom member disposed parallel to said first boom member and mounted for axial movement relative thereto; a processing head mounted on said second boom member for axial movement along said second boom member; a clamp assembly mounted on said first boom member adjacent one end thereof for movement away from and toward said one end; and drive means acting on said movable boom member, said processing head and said clamp assembly, said drive means being effective to move said processing head and said clamp assembly relatively away from one another in a first condition of operation and to move said processing head and said clamp



assembly relatively toward one another in a second condition of operation.

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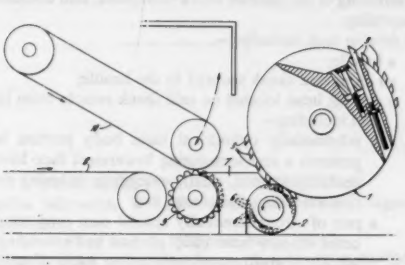
**4,109,690**

## CHIPPER

**Niilo Nikodemus Berg, Helsinki, Finland, assignor to Rauma-Repola OY, Finland**

**Filed Dec. 20, 1976, Ser. No. 752,424**
**Claims priority, application Finland, Dec. 23, 1975, 753629**
**Int. Cl.[2] B27L 11/08**
**U.S. Cl. 144—163** **4 Claims**



1. A chipper for chipping various wood material, such as entire trees, branches, tree tops, bushes, and small trees, said chipper having a feed end and an output end, said chipper comprising:

(a) a rotatable, cylindrical blade drum having a plurality of finger-shaped blades projecting from the cylindrical surface of said blade drum, said blades being spaced from each other in the longitudinal direction of said blade drum;

(b) a cylindrical, rotatable counter-blade, rotatable in the same direction as the blade drum about an axis parallel to that of said blade drum;

(c) a plurality of recesses provided on the surface of the rotatable counter-blade arranged to coincide with the finger-shaped blades on the surface of the blade drum, said recesses corresponding in shape to the shape of said blades, said blade drum and rotatable counter-blade being spaced sufficiently close so as not to permit chipped wood to pass between the cylindrical surfaces of said blade drum and rotatable counter-blade;

(d) means connected to the blade drum and rotatable counter-blade for synchronously rotating said blade drum and said counter-blade to successively position each blade in its corresponding recess; and

(e) a stationary counter-blade at the feed end of the chipper so mounted as to be in close proximity to the cylindrical surface of the rotatable counter-blade and to the rotating blades on the blade drum.

**4,109,691**

## COMBINATION TORQUE RELEASE SCREW AND SCREW DRIVER

**Floyd Leroy Wilson, 1015 Moro St., Manhattan, Kans. 66502**

**Filed Dec. 21, 1977, Ser. No. 862,740**
**Int. Cl.[2] B28D *15/00***
**U.S. Cl. 145—50 D** **2 Claims**

1. The combination of a driving tool and a torque release screw fastener frictionally coupled to said tool in a relationship for screwing of the fastener into a workpiece, said combination comprising:

a driving tool, including--

a handle;

an elongated shank secured to the handle;

a driving head located on said shank remote from handle and including--

a substantially cylindrical main body portion which presents a screw-engaging lowermost face having a centrally located, axially extending, indexing projection extending therefrom; and

a pair of circumferentially spaced cam projections located on said main body portion and extending outwardly therefrom, corresponding parts of said cam projections being spaced apart about 180° on said main body portion, said projections each presenting a smoothly arcuate outer surface extending tangentially from said main body portion, there being a lug-engaging surface extending outwardly from the outermost terminus of each arcuate, outer surface, the diameter of said main body portion combined with the widths of said pair of cam projections being greater than said diameter;

a torque release screw fastener frictionally coupled to said tool in a driving relationship, said fastener including--

an elongated, threaded shank;

a head secured to said shank and presenting--

an upper face engageable with said screw-engaging face of said main body portion, said head including structure defining a central, axially extending opening through said upper face for rotatably receiving said indexing projection; and

a pair of spaced, upstanding lugs frangibly secured to said upper face and located at the periphery of the upper face about 180° apart, each of said lugs presenting an inner, upstanding operating edge and a surface-engaging face, the shortest distance between said operating edges being slightly greater than said diameter of the main body portion but less than said diameter combined with the widths of said cam projections,

said lugs being frangibly coupled to said head such that the lugs will transmit torque to said head up to a predetermined level, but will break free from the head when torque is applied thereto greater than said predetermined level,

said main body portion and head being oriented such that--

said main body portion is between said lugs with the lowermost face of the main body portion in engagement with the upper face of said head and said indexing projection is received in said head opening,

the outer surfaces of said cam projections are respectively in frictional engagement with a corresponding adjacent lug operating edge for frictionally coupling said fastener to said tool,

said lug-engaging surfaces are respectively located adjacent to a surface-engaging face of one of said lugs, and

said main body portion is rotatable relative to said head when said fastener is fully screwed into said workpiece for causing engagement between said lug-engaging surfaces and the corresponding adjacent faces of said lugs in order that, when a torque in excess of said predetermined torque is applied to said lugs by said tool, said lugs break free of said head.

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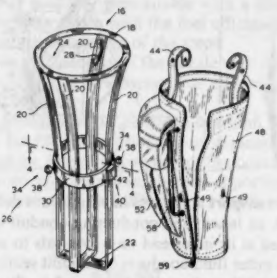
**4,109,692**

## ENCAPSULATING DEVICE FOR GAS CYLINDER

**Roland H. Brown, 13409 Conch Ct., Tampa, Fla. 33618**

**Filed Jun. 30, 1977, Ser. No. 811,487**
**Int. Cl.[2] B65D *61/00***
**U.S. Cl. 150—52 R** **6 Claims**



1. An encapsulating device for a gas cylinder having a valve and gauge assembly thereon for use with emergency medical equipment, said encapsulating device comprises an open cage assembly to enclose and protect the gas cylinder and valve and guage assembly, said open cage assembly comprises a protective ring disposed adjacent the valve and gauge assembly and a base to support the gas cylinder held in fixed spaced relation relative to each other by a plurality of legs extending therebetween to permit operation of the gas cylinder while within said encapsulating device, a first retainer means comprising an elongated flexible spring member movable between a first and second position attached to the upper portion of one of said legs wherein the lower portion of said spring member is disposed to engage the upper portion of the gas cylinder when in said first position to secure the gas cylinder device in said encapsulating device and to disengage the upper portion of the gas cylinder when in said second position to permit removal of the gas cylinder from said encapsulating device, a second retainer means to retain the gas cylinder within said open cage assembly comprising a retainer ring disposed to surround the gas cylinder at the mid portion thereof and a holding means to fixedly engage the gas cylinder for retention thereof in said encapsulating device, said protective ring being at least twice the diameter of said base such that said legs extending therebetween follow the natural anatomical contour of the patient's legs when in use, said encapsulating device further comprising an attachment means fixedly attached to said retainer ring for

the removable attachment of said encapsulating device to the wall of a structure for storage.

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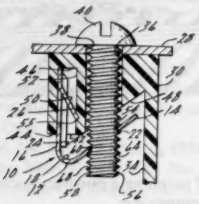
**4,109,693**

## FASTENER

Joseph H. Paskert, Lakewood, Ohio, assignor to Eaton Corporation, Cleveland, Ohio

Filed Nov. 25, 1974, Ser. No. 526,887
Int. Cl.[2] F16B *37/02, 37/04*
U.S. Cl. 151—41.75 1 Claim



1. A self-retaining fastener for lockingly engaging, upon rotational tightening, a longitudinally, non-rotationally inserted screw, and for preventing longitudinal, non-rotational removal thereof, the

(A) a retaining portion adapted to be non-rotationally positioned proximate the end opposite that end from which the screw is to be inserted of a clearance bore adapted to receive said screw, said retaining portion comprising a retaining arm resiliently attached to said locking portion and forming an acute included angle therewith, said retaining arm including a spring tab extending outward from one side of said retaining arm; and

(B) a generally flat locking portion resiliently cantilever carried by said retaining portion and having formed therethrough a generally circular aperture sized to accept the major diameter of said screw, said locking portion having a relaxed position wherein said locking portion is disposed in an angular relationship relative to the axis of the clearance bore such that the axis of said aperture describes an acute angle with the axis of the clearance bore, said aperture when said locking portion is in the relaxed position hwaving a proportion on a plane normal to the axis of said bore which is smaller than the major diameter of said screw said locking portion being movable in response to the insertion of said screw through said clearance bore to a loaded position wherein the axis of said aperture is more nearly coincident with the axis of said clearance bore thereby allowing the ratcheting insertion of said screw; and being further movable in response to tightening engagement of the inserted screw to a locked position wherein the surfaces of the locking portion adjacent the clearance bore threadedly engage the screw.

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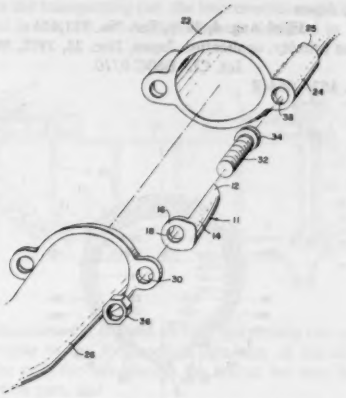
**4,109,694**

## CLAMP REPAIR UNIT

Raymond Jones, 152 E. Market St., Long Beach, N.Y. 11561

Filed May 11, 1976, Ser. No. 685,278
Int. Cl.[2] F16B *43/00*
U.S. Cl. 151—69 3 Claims

1. A clamp repair unit to fit about a typical boss as found on a casting so as to retain a suitable fastener thereto, the unit comprising a unitary part formed of rigid metallic material having a half-hollow preferably semi-circular in cross section body portion, at one end of which is a transversely extending relatively flat fastener retaining portion defining a bearing surface defining a peripherally closed hole therethru into which a fastener, such as a bolt may fit, and at the other end the half-hollow body portion is closed forming a hook to fit behind



and clampingly engage the boss so that the hook transfers the full tension load from the fastener to the boss.

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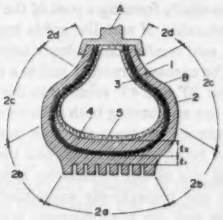
**4,109,695**

## PUNCTURE-PROOF TUBELESS TIRES

Teruhiko Miyazato, 18-7, Shiomi-cho, Sasebo-shi, Nagasaki-ken, Japan

Filed Nov. 1, 1976, Ser. No. 737,767
Claims priority, application Japan, Nov. 14, 1975, 50/136156
Int. Cl.[2] B60C *21/08*
U.S. Cl. 152—347 7 Claims



1. A puncture-proof tubeless tire which comprises:

(a) an outer first rubber layer consisting of a crown having a tread with patterned portions, shoulders, side walls and bead portions;

(b) a cord layer provided on the inner surface of the outer first rubber layer;

(c) a reinforcing second rubber layer provided on the inside of the cord layer at its region corresponding at least to the crown and the shoulders; and

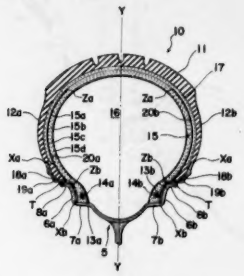
(d) a lining agent present in the interior of the tire, said lining agent comprising a mixture of an adhesive, 20 to 60 percent of diethylene glycol based on the weight of the adhesive and rubber particles dispersed in the mixture.

4,109,696

## PNEUMATIC TIRE FOR MOTORCYCLE

Eiji Nakasaki, Kakogawa, and Hisashi Shirashoji, Kobe, both of Japan, assignors to Sumitomo Rubber Industries, Ltd., Kobe, Japan

Filed Aug. 4, 1976, Ser. No. 711,614
Claims priority, application Japan, Dec. 25, 1975, 50-157023
Int. Cl.[2] B60C 9/10
U.S. Cl. 152—354 R 1 Claim



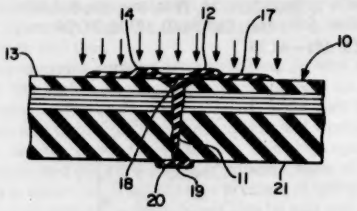
1. A pneumatic tire for use on a motorcycle, which comprises a tire cover made of a rubber material and having a tread portion, a pair of opposed side walls integrally extending from respective side edges of the tread portion, and a pair of opposed bead portions integrally extending from respective free ends of the individual side walls, said bead portions being adapted to firmly engage with associated rim flanges of a wheel rim, said tire cover including bead cores embedded respectively in the bead portions and a reinforcing structure for preventing the tire from collapsing when it is at least partially deflated which comprises a carcass structure embedded in the tire cover adjacent the inner surface thereof, said carcass structure having a plurality of plies of textile cords which are alternately disposed on a bias with respect to each other and at a predetermined cord angle relative to the midcircumferential plane of the tire, said carcass structure having both ends turned up around the respective bead cores and secured in position adjacent the free ends of the side walls, at least one reinforcement layer substantially forming a part of the carcass structure and made of a plurality of metallic cords impregnated with a rubber material, said reinforcement layer being laid down on a bias relative to the carcass structure and at a cord angle within the range of from 20° and 45° relative to the midcircumferential plane of the tire and having both ends terminating adjacent respective boundaries between the side walls and the bead portions without being turned up around the associated bead core, at least one pair of side reinforcing layer made of a hard rubber material and respectively embedded in between the carcass structure and the reinforcement layer in spaced and substantially opposed relation to each other, each of said side reinforcing structure having an outer periphery, which is situated at a point corresponding to the boundary between the tread portion and the adjacent side wall, and an inner periphey which is situated at a point corresponding to a shoulder of the rim flange when the tire is mounted on the wheel rim, said reinforcing structure representing the principal reinforcing portion of the tire, each of said side walls having an outwardly protruding and circumferentially extending excrescence integrally formed therewith at a portion of the side wall which may contact an outer periphery of the corresponding one of the rim flanges when the tire is mounted on the wheel rim and at least one pair of protective layers made of a hard rubber material, each of said protective layers being applied to outer surfaces of the excrescence and said bead portions.

4,109,697

## METHOD AND PATCH USED IN THE REPAIR OF A PNEUMATIC TIRE

Merritt W. Wolfe, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Mar. 28, 1977, Ser. No. 782,251
Int. Cl.[2] B60C 21/00
U.S. Cl. 152—367 11 Claims



1. A method of patching a puncture such as a nail hole, in a pneumatic tire, comprising:

(a) covering the puncture with a patch adjacent the inner peripheral surface of the tire;

(b) interposing unvulcanized rubbery material between the patch and puncture;

(c) directing fluid pressure and heat against the patch to compress the patch against the tire and unvulcanized rubbery material to force the material into the puncture, and vulcanize the material driven into the puncture, and bond the patch to the inner peripheral surface of the tire; and

(d) restricting the outward movement of the unvulcanized rubbery material beyond the patch so as to force said rubbery material into the puncture when pressure is exerted on the patch and rubbery material.

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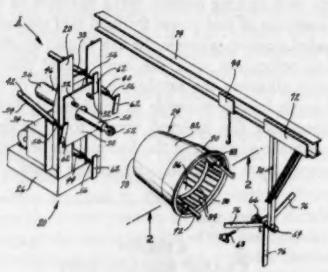
4,109,698

## MACHINE FOR INSTALLING GIANT TIRES ON ONE-PIECE RIMS

Vallie D. West, 724 N. Washington, and Jesse Kennedy, 201 S. Illinois, both of Du Quoin, Ill. 62832

Filed May 18, 1977, Ser. No. 797,997
Int. Cl.[2] B60C 25/06
U.S. Cl. 157—1.2 17 Claims



1. A machine for installing a tire on a rim having flanges at its ends and a channel-shaped portion between the flanges, said machine comprising: a frame; a tapered guide having a large end which corresponds generally in diameter to the outer diameter of a flange on a flanged rim and a small end which is small enough to fit into a tire to be mounted on the rim; means for positioning the guide in a fixed position with respect to the frame and for securing the guide against the rim with the large end of the guide aligned with one of the flanges on the rim such that the large end of the guide forms a tapered approach to the

periphery of that flange; and first, second and third fluid operated cylinders on the frame, each cylinder having a pressing shoe that is independent of other pressing shoes and moves generally along, but slightly outwardly from, the tapered surface of the guide and is further positioned such that it will bear facewise against the sidewall of the tire positioned around the guide, the first cylinder being located intermediate the second and third cylinders so that the shoes on the second and third cylinders will bear against the sidewall of the tire to the sides of the location at which the shoe for the first cylinder bears against the sidewall; whereby the cylinders maneuver the tire over the tapered guide and onto the rim such that the inner margins of the sidewalls are between the flanges on the rim.

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**4,109,699**

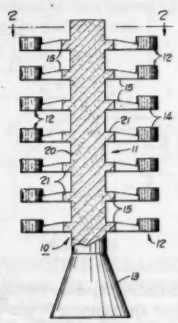
## PATTERN ASSEMBLY

**Robert R. Miller, Shaker Heights, and Robert A. Horton, Chesterland, both of Ohio, assignors to Precision Metalsmiths, Inc., Cleveland, Ohio**

**Continuation of Ser. No. 511,458, Oct. 2, 1974, abandoned. This application Mar. 5, 1976, Ser. No. 664,241**

**Int. Cl.² B22C *7/02***

**U.S. Cl. 164—244** **7 Claims**



1. A pattern set-up for use in the lost pattern process of investment casting comprising:

(a) a center tree including a stem and a plurality of collars which project from the sides of said stem and are spaced apart along its length,

(b) the laterally projecting width of each collar from the side of said stem to the outside of the collar measured along a diameter of said stem being smaller than said diameter,

(c) the juncture of each of said collars with said stem being structurally continuous about said stem and extending substantially the full axial thickness of the collar,

(d) a plurality of patterns arranged about said collars, and

(e) gate members extending from said patterns and having end portions connected to said collars.

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**4,109,700**

## ARRANGEMENT FOR INTRODUCING A FLEXIBLE STARTER BAR INTO A CONTINUOUS CASTING PLANT

**Werner Scheurecker, Linz, Austria, assignor to Vereinigte Osterreichische Eisen-und Stahlwerke - Alpine Montan Aktiengesellschaft, Linz, Austria**

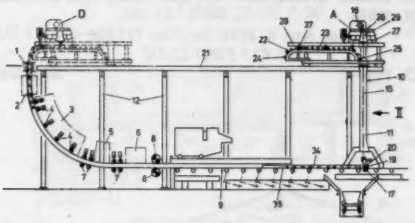
**Filed Mar. 11, 1977, Ser. No. 776,540**

**Claims priority, application Austria, Mar. 23, 1976, 2112/76**

**Int. Cl.² B22D *11/08***

**U.S. Cl. 164—426** **10 Claims**

1. In an arrangement for introducing a flexible starter bar, having a head end, a foot end and a starter bar head, from above into a continuous casting plant of the type including a mould, a strand guide following the mould, an introduction part for introducing said starter bar into the strand guide, a lifting mechanism for gripping and lifting the starter bar, a transporting car provided with a sliding or roller path having an arcuate front end part and an arcuate rear end part, the starter bar being movable to the introduction part by the transporting car, and a conveying means for the starter bar provided on the transporting car, the improvement which is characterized in that the conveying means is designed as



a displacement car located on the transporting car and being movable in the longitudinal direction of the sliding or roller path for introducing the starter bar into the introduction part, and

first and second catch means provided on the displacement car to engage with the starter bar.

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**4,109,701**

## METHOD OF CONVEYING HEAT ENERGY

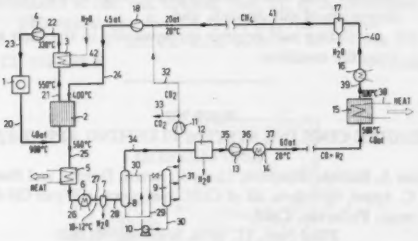
**Friedrich Hilberath, Walberberg, and Johannes Teggers, Wesseling, both of Fed. Rep. of Germany, assignors to Rheinische Braunkohlenwerke AG., Cologne, Fed. Rep. of Germany**

**Filed Aug. 1, 1975, Ser. No. 601,214**

**Claims priority, application Fed. Rep. of Germany, Aug. 7, 1974, 2437975**

**Int. Cl.² F28C *3/02*; C09K *5/00***

**U.S. Cl. 165—1** **3 Claims**



1. In the method of conveying heat energy from a location of heat production to a location of heat consumption wherein methane is endothermically reacted in the presence of water vapor at elevated temperature and pressure at a location of heat production to a gaseous mixture comprising carbon monoxide, water, carbon dioxide, hydrogen, and methane, the gaseous mixture is conveyed to a location of heat consumption, the gaseous mixture is exothermically reacted to re-form methane and the heat energy generated thereby is utilized, the improvement comprising:

after production of said gaseous mixture and before the gaseous mixture is conveyed to a location of heat consumption, removing carbon dioxide from the gaseous mixture, freeing the gaseous mixture of water vapor and water to an extent that the water vapor content in the mixture is not more than that which would exist at normal pressure and ambient temperature;

conveying the so-treated gaseous mixture to a location of heat consumption; and utilizing the so-treated gaseous mixture for the exothermic re-formation of methane in a

dry methanization step without steam addition at elevated pressures of between 10 and 100 atmospheres gauge and at temperatures of between about 400° and 650° C.

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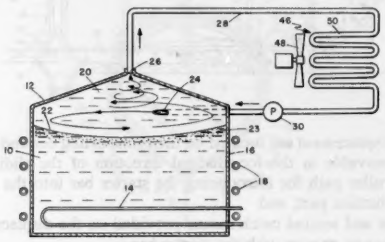
**4,109,702**

## ENERGY STORAGE AND RETRIEVAL AS HEAT

**Norman Donald Greene, Box 148, Sun Valley Rd., Del Mar, Calif. 92014**

**Filed Aug. 6, 1976, Ser. No. 712,353**
**Int. Cl.[2] F28D *21/00***
**U.S. Cl. 165—1** **20 Claims**



1. The method of storing energy and retrieving such stored energy as heat, that includes

(a) providing a liquid system that consists essentially of a salt melt lower layer, an upper layer of additive liquid other than water which is immiscible with the salt melt, and an emulsion of said melt and additive liquid intermediate said upper and lower layers,

(b) effecting latent heat transfer from the melt to the additive liquid within the emulsion layer, and transferring heat from the additive liquid,

(c) maintaining active flowing movement of the emulsion to enhance said latent heat transfer, and which results in formation of salt crystals, and

(d) gravitating said crystals downwardly in the melt away from the emulsion.

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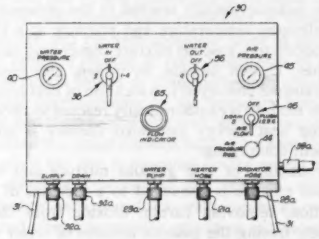
**4,109,703**

## ENGINE COOLING SYSTEM FLUSHING APPARATUS AND METHOD

**John A. Babish, Glendora; Larry K. Arnot, Duarte, and Douglas C. Appel, Glendora, all of Calif., assignors to Wynn Oil Company, Fullerton, Calif.**

**Filed Nov. 11, 1976, Ser. No. 741,065**
**Int. Cl.[2] F28G *9/00***
**U.S. Cl. 165—1** **18 Claims**



17. The method of flushing an internal combustion engine liquid cooling system, the system including a liquid coolant heat radiator and the engine having cooling passages, said method including

(a) providing a controlled pressurized flow of flushing liquid and entrained gas bubbles,

(b) and passing said flow alternately through

(i) the radiator in a reverse direction, independently of the engine coolant passages,

(ii) the engine coolant passages in a reverse direction, independently of the radiator,

(iii) the radiator in a forward direction, independently of the engine coolant passages,

(iv) the engine coolant passages in a forward direction, independently of the radiator.

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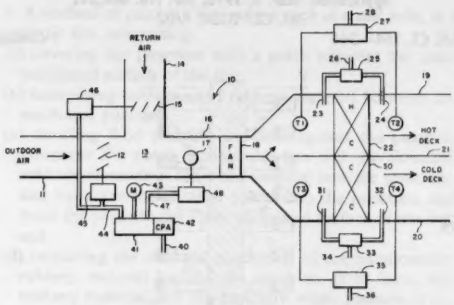
**4,109,704**

## HEATING AND COOLING COST MINIMIZATION

**Donald H. Spethmann, Arlington Hts., Ill., assignor to Honeywell Inc., Minneapolis, Minn.**

**Filed Mar. 28, 1977, Ser. No. 781,898**
**Int. Cl.[2] F25B *29/00*; F24F *3/10***
**U.S. Cl. 165—16** **21 Claims**




1. In an air conditioning system having a supply duct and return air and outdoor air dampers to mix the air in said supply duct, a hot deck supplied with air from said supply duct and heating means to heat the air in said hot deck, and a cold deck supplied with air from said supply duct and cooling means to cool the air in said cold deck, a control system for minimizing the cost of the energy to heat the air in the hot deck and cool the air in the cold deck, said control system comprising:

first means for supplying a first signal dependent upon the amount of heating done in the hot deck;

second means for supplying a second signal dependent upon the amount of cooling done in the cold deck;

weighting means for adjusting the weighting to be given to said first and second signals;

comparison means connected to said first means, said second means and said weighting means for producing an output dependent upon the difference between the amount of cooling and the amount of heating and adjusted for the difference between the relative weighting of the first and second signals;

control means connected to the output of said comparison means and adapted to control the return air and outdoor air damper to control the temperature of the air in the supply duct according to said first and second signal as weighted by said weighting means.

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**4,109,705**

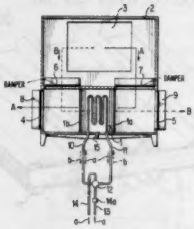
## HEAT EXCHANGE IN VENTILATION INSTALLATION

**Knut Bergdahl, Kvartsgrand 4, 852 52 Sundsvall, Sweden**

**Division of Ser. No. 529,525, Dec. 4, 1974, Pat. No. 3,980,129.**
**This application Jun. 15, 1976, Ser. No. 696,272**
**Claims priority, application Sweden, Dec. 4, 1973, 73163263**
**Int. Cl.[2] F25B *29/00***
**U.S. Cl. 165—17** **7 Claims**

1. Apparatus for recovering heat in a ventilation installation

having an air supply duct and an air exhaust duct, comprising a heat exchanger to transfer heat from said exhaust air to the supply air, said heat exchanger having means to direct the exhaust air from said exhaust duct to flow longitudinally through the exchanger from one end to the other end, means to



direct heat exchange medium from said supply duct to flow through the exchanger with opposed flow, and reversing means to reverse concurrently during operation of the heat exchanger both the air flow and the medium flow whereby said exhaust air is directed to flow through the exchanger from the said other end to the said one end.

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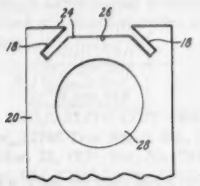
**4,109,706**

## THERMALLY CONDUCTIVE CERAMIC ATTACHMENT

**Michael J. Noone, Wayne, Pa., assignor to General Electric Company, Fairfield, Conn.**

**Filed Mar. 10, 1977, Ser. No. 776,271**
**Int. Cl.² G05D *23/00*; F28F *13/18, 21/00***
**U.S. Cl. 165—32** **4 Claims**



1. A male element for mating with a female element to make a thermally conductive connection between

a. a cooling element for receiving heat flux from

b. the cooled end of a structure having an opposed hot end which receives heat flux from a source at a temperature greater than the permissible operating temperature of the cooled end:

comprising:

c. a male metal face adapted to mate with a female metal face on a female element;

d. two metal legs extending from the said male metal face, adapted to enter two slots in the said female metal face;

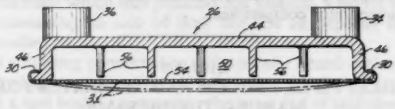
e. a coating on the said male metal face and the said metal legs of a fusible metal having a melting point less than the maximum permissible operating temperature of the said cooled end, and adapted, when molten, to wet the said male metal face and the said metal legs and the said female metal face.

**4,109,707**

## FLUID COOLING SYSTEMS FOR ELECTRONIC SYSTEMS

**Edward A. Wilson, and James D. Fredenberg, both of Phoenix, Ariz., assignors to Honeywell Information Systems, Inc., Phoenix, Ariz.**

**Division of Ser. No. 592,578, Jul. 2, 1975. This application Mar. 16, 1977, Ser. No. 778,308**
**Int. Cl.² F28F *21/00, 7/00***
**U.S. Cl. 165—46** **6 Claims**



5. A heat exchanger comprising:

means forming a chamber adapted to contain a liquid, a portion of sid means being a substantially planar flexible thin wall having an area substantially in the range of from 25 to 64 square centimetersand made of a good thermal conductor,

inlet means and outlet means formed in said chamber for permitting a liquid having a pressure substantially in the range of from 1 to 10 pounds per square inch to flow through said chamber, and

means within said chamber for causing said liquid to flow substantially uniformly over the flexible thin wall of said chamber means, said means within said chamber being spaced from said flexible thin wall.

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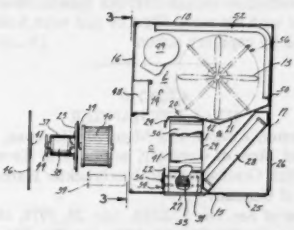
**4,109,708**

## AIR CONDITIONER UNIT HAVING COMPARTMENT PROVISIONS FOR ACCESS AND MOTOR COOLING

**Sadik S. Imral, St. Louis, Mo., assignor to Intertherm, Inc., St. Louis, Mo.**

**Continuation of Ser. No. 606,538, Aug. 21, 1975, abandoned. This application Jan. 24, 1977, Ser. No. 762,008**
**Int. Cl.² F24F *1/02***
**U.S. Cl. 165—48 R** **5 Claims**



1. A self-contained air conditioner unit of the type having a motor for blowing cooled air separate from the motor for cooling the condenser, comprising

a housing having an angled divider extending top to bottom, whereby to divide the housing into an evaporator compartment bounded on two adjacent sides by a condenser compartment,

the evaporator compartment having a return air inlet, an evaporator coil, and a blower whose scroll leads to a cooled air outlet,

the condenser compartment having a compressor, a main outside air inlet having a condenser coil thereadjacent, and a warm air outlet having an exhaust fan thereat mounted on the vertical shaft of a first motor,

the condenser compartment further including an air corridor portion along one side of the evaporator compartment,

said air condenser portion including an auxiliary air inlet spaced from the main outside air inlet, and

a second motor powering said evaporator compartment blower positioned within said air corridor portion of the condenser compartment in the path of air flow between said auxiliary air inlet and the exhaust fan,

said second motor having a horizontal shaft passing through a portion of said divider to mount the wheel within the scroll of said blower,

whereby the heat from the evaporator motor is carried by air from the auxiliary air inlet through the air corridor portion to the condenser exhaust fan without entering the evaporator compartment.

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**4,109,709**

## HEAT PIPES, PROCESS AND APPARATUS FOR MANUFACTURING SAME

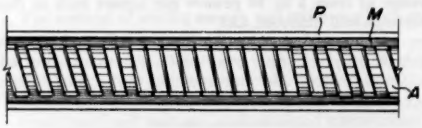
**Ichiro Honda; Shigetoshi Takasu, both of Tokyo, and Yoshio Onuki, Yachiyo, all of Japan, assignors to Suzuki Metal Industrial Co, Ltd., Tokyo, Japan**

**Division of Ser. No. 468,033, May 8, 1974, Pat. No. 4,018,269. This application May 17, 1976, Ser. No. 686,983**

**Claims priority, application Japan, Sep. 12, 1973, 48-103494; Nov. 8, 1973, 48-129393[U]; Nov. 8, 1973, 48-129394[U]**

**Int. Cl.² F28D *15/00***

**U.S. Cl. 165—105** **6 Claims**




1. In a wick-secured inner tubular material for a heat pipe, the combination comprising an elongated metal tubular material, a wick of metal fibers in tow form disposed about said metal tubular material, an oxidized film on the surface of said metal fibers to provide a rough surface on said metal fibers to increase the wettability thereof, and a binding material disposed about said wick to secure the wick to said metal tubular material, said metal tubular material with the wick of metal fibers secured hereto by said binding material being adapted to be disposed within an elongated outer tubular means to form said heat pipe with the metal fibers of said wick holding a heat transfer liquid by capillary action.

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**4,109,710**

## HEAT EXCHANGER

**Siegfried Förster, Alsdorf, and Manfred Kleemann, Quadrath, both of Fed. Rep. of Germany, assignors to Kernforschungsanlage Jülich Gesellschaft mit beschrankter Haftung, Jülich, Fed. Rep. of Germany**

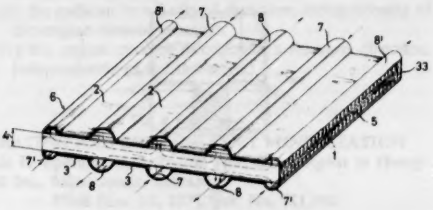
**Continuation of Ser. No. 572,759, Apr. 29, 1975, abandoned. This application Oct. 12, 1976, Ser. No. 731,672**

**Claims priority, application Fed. Rep. of Germany, Apr. 30, 1974, 2420827**

**Int. Cl.² F28F *3/12***

**U.S. Cl. 165—165** **5 Claims**

1. A double channel counter flow heat exchanger means having an independently removable matrix construction with cold free sides and a hot middle range subjected to high temperature differences at up to 450 psi; that normally would lead to undesired deformation for effecting heat exchange between first and second fluid mediums comprising in combination spaced walls forming said spaced sides, chamber-forming means including pleated means between said walls with the folds of said pleated means extending between and secured to said walls to form a chamber between each side of said pleated member and the adjacent wall, closure means between the sides of said walls to close the sides of said chamber, closure means connected to the ends of the pleated means to close the ends of said folds and the ends of said chambers between the ends of said walls, a plurality of channel means in each of said walls extending between the ends of said walls and across said folds and opening into the chamber formed by said folds, said channel means in each wall having inlets and outlets for a fluid




medium at one end of the wall, so that one medium may flow through inlet channel means and between the folds to outlet channel means in each chamber to emerge from the same end of said wall, the inlets and outlets of each wall being at the end opposite the inlets and outlets of the other wall collectively in a mirror image as to guidance of fluid medium flow therewith.

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**4,109,711**

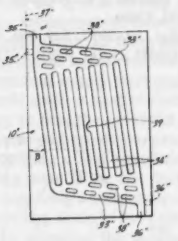
## HEAT EXCHANGE PANEL

**Charles A. Kleine, Florissant, Mo., and Verne L. Middleton, East Alton, Ill., assignors to Olin Corporation, New Haven, Conn.**

**Continuation-in-part of Ser. No. 573,953, May 2, 1975. This application Nov. 17, 1975, Ser. No. 632,502**

**Int. Cl.² F28F *3/14*; F24J *3/02*; F28F *9/22***

**U.S. Cl. 165—170** **9 Claims**



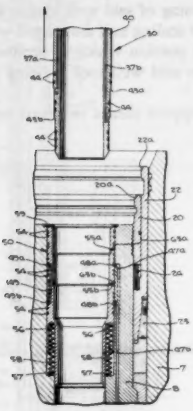
1. A hollow sheet metal plate for use in a solar energy collector system having a system of fluid passageways for a heat exchange medium extending internally therein including opposed headers and passageways of substantially uniform cross section extending longitudinally in said plate in a direction transverse to and interconnecting said headers, including entry and exit portions extending from opposite ends of said headers to opposed edges of said panel to provide ingress and egress openings for a heat exchange medium, said headers possessing outer boundaries defining the perimeter thereof, wherein at least one of said boundaries lying adjacent the apex of said perimeter defines an external angle of at least 91° with respect to a longitudinal edge of said metal plate, and said longitudinally extending passageways are disposed at an angle of at least 1° with respect to said longitudinal edge along substantially the entire length thereof, said plate being characterized by efficient drainage of said heat exchange medium, wherein said angles define inclined headers and inclined connecting portions for uniform fluid distribution regardless of whether said longitudinal edge is located in a horizontal or a vertical plane.

4,109,712

## SAFETY APPARATUS FOR AUTOMATICALLY SEALING HYDRAULIC LINES WITHIN A SUB-SEA WELL CASING

A. Michael Regan, Huntington Beach, Calif., assignor to Regan Offshore International, Inc., Torrance, Calif.

Filed Aug. 1, 1977, Ser. No. 820,829
Int. Cl.[2] E21B *33/035*
U.S. Cl. 166—340 15 Claims



1. An improved safety apparatus for automatically sealing hydraulic lines within a sub-sea well casing when said casing is disconnected from an associated well head connector, comprising the provision of:

mandrel means associated with a well head connector assembly;

valve means generally coaxially aligned within said casing head for receiving said mandrel means and for controlling fluid flow through associated hydraulic lines, said valve means being urged into a valve-opened position by said mandrel means as said well head connector assembly is secured to said well casing head; and

bias means associated with said valve means for urging said valve means into a valve-closed position to seal said hydraulic lines when said mandrel means is withdrawn from said valve means.

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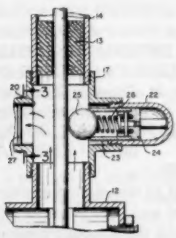
4,109,713

## PUMPING WELL BLOW-OUT PREVENTER

Joseph Kenton Clow, 12745 Tree Ranch Rd., Ojai, Calif. 93023

Filed Mar. 25, 1977, Ser. No. 781,214
Int. Cl.[2] E21B *33/06, 17/00*
U.S. Cl. 166—53 2 Claims



1. In a pumping well including a three-way well head fitting with a lower coupling to the lower end of a pipe string, an axially aligned upper coupling for receiving a stuffing box through which a polished rod in said pipe string passes and a lateral outlet connecting to an oil flow line for collecting pumped oil, an improved blow-out preventer for blocking oil from passing out said stuffing box from said pipe string in the event said polished rod should break or otherwise be ejected from said stuffing box, said blow-out preventer comprising, in combination:

(a) a four-way well heat fitting dimensioned to be substituted for said three way well head fitting so that the overall height of the well head structure is not increased, said four way well head fitting having a lower coupling for coupling to the upper end of said pipe string, an axially aligned upper coupling for receiving said stuffing box through which said polished rod extends, a lateral outlet connecting to said oil flow line and an opposite lateral outlet;

(b) a housing connected to said opposite lateral outlet;

(c) a sleeve received in said housing;

(d) a seat bushing secured to the inner end of said sleeve;

(e) a ball positioned at the outer end of said sleeve;

(f) a coiled compression spring in said sleeve with one end seated in said seat bushing and its other end bearing against said ball; and

(g) a pipe section of given length secured to the end of said seat bushing opposite the end on which said spring seats and extending axially to engage the end wall of said housing and position said seat bushing at said given length from said end wall,

whereby should said polished rod break or otherwise be ejected from said stuffing box, said ball is ejected into the central portion of said four-way fitting and urged against the lower entrance opening of said stuffing box by oil pressure to thereby block oil from passing through the stuffing box to the exterior of said well head and whereby said given length can be changed by cutting off the extending end portion of said pipe so that said seat bushing and sleeve can be positioned further in said housing closer to said end wall to accommodate the blow-out preventer to a pumping well having a larger diameter polished rod.

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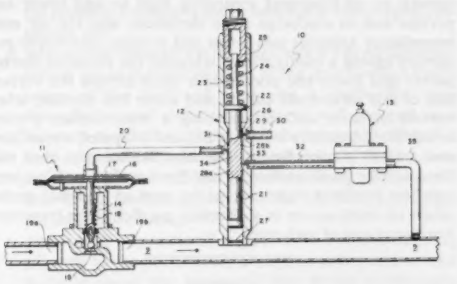
4,109,714

## SHUTDOWN SYSTEM FOR HIGH PRESSURE WELL

Donald Roy Greenlee, Dallas, and Milton Wayne Burns, Abilene, both of Tex., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Aug. 16, 1977, Ser. No. 825,017
Int. Cl.[2] E21B *43/12*
U.S. Cl. 166—53 6 Claims



1. A high pressure well shutdown system for preventing high pressure fluids from entering the flowline of a wellhead, said shutdown system comprising:

a pressure actuated, normally open, flow valve connectable in fluid communication with a well fluid outlet of a wellhead;

a pressure sensor assembly fluidically connectable to a wellhead fluid conduit downstream of said flow valve and having pressure responsive means in fluid communication with said wellhead fluid conduit;

said pressure responsive valve means has a slidable piston having a biasing spring abutting thereon, a lower peripherial seal and an upper peripherial seal defining an undersized flow area around said piston, and a pressure response area at one end of said piston adapted to respond to pressure in said wellhead fluid conduit;

a pressure transmission conduit in fluid communication with the wellhead fluid conduit downstream of said pressure sensor assembly and adapted to transmit fluid pressure from the wellhead fluid conduit through said pressure responsive valve means; and

closing pressure conduit means connecting said pressure responsive valve means to said flow valve.

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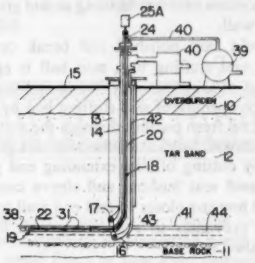
**4,109,715**

## SYSTEM AND APPARATUS FOR EXTRACTING OIL AND THE LIKE FROM TAR SANDS IN SITU

**James Sidney Adamson, 539-47th Ave. SW., Calgary, Canada (T2S1C5)**

**Filed Nov. 29, 1976, Ser. No. 745,691**
**Claims priority, application Canada, Dec. 5, 1975, 241290**
**Int. Cl.[2] E21B *43/00*; E21C *41/00***
**U.S. Cl. 166—177** **22 Claims**




1. Apparatus for the separation of oil and the like from tar sands comprising in combination with a source of power, a substantially cylindrical directional casing, adapted to be placed within a well bore in said tar sands, a vibrating probe assembly engaged within said casing, means at the lower end of said casing to control the radial direction of the lower end portion of said probe assembly exiting therefrom, means to provide vibration to said lower end portion and means to convey an oil-from-sand separating fluid to said lower end portion and to discharge same therefrom into the tar sand immediately adjacent said lower end portion, said lower end portion having a configuration whereby the vibration thereof moves said lower end portion in a circle around the vertical axis of said directional casing, said lower end portion, when viewed in cross section, including a front surface portion which is substantially semi-circular and a tapered streamlined rear surface portion having a greater surface area than said front surface portion whereby said front surface portion presents less frictional resistance to the sand so that said probe, when vibrated, moves in a direction parallel to the transverse horizontal axis of said probe.

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**4,109,716**

## SEAL

**Carlos R. Canalizo, Dallas, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.**

**Continuation of Ser. No. 597,962, Jul. 21, 1975, abandoned. This application Feb. 16, 1977, Ser. No. 769,263**
**Int. Cl.[2] E21B *33/12***
**U.S. Cl. 166—191** **6 Claims**

1. Apparatus comprising:

(a) a nipple having an interior cylindrical surface;

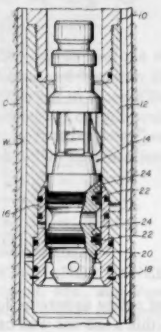
(b) a well tool having an exterior cylindrical surface and adapted to be run in a well and adapted to be landed and sealed in said nipple so that fluid flow in the annulus between said interior cylindrical surface and said exterior cylindrical surface is blocked at the sealing location; and

(c) at least one annular sealing system comprising:

(i) said exterior cylindrical surface having an annular recess located at the site where it is desired to block the fluid flow, and said exterior cylindrical surface being located so that it is exposed to flowing well fluids during the running of said well tool in a well, and

(ii) an annular sealing unit associated with said recess and including a portion which is exposed to flowing well fluids when said well tool is being run in a well and including

(A) ring support means received entirely within said recess,




(B) annular deformable sealing means secured to said ring support means and having a portion received within said recess and a portion projecting from said recess for sealing with said interior cylindrical surface,

(C) said sealing means including a pair of spaced sealing members with each sealing member having an outer convex curved sealing face projecting from said recess and with said sealing means being contoured to provide a space between the sealing faces into which the sealing members may flow when deformed and with each sealing member sized so that said portion projecting from said recess provides an interference fit with said interior cylindrical surface when said well tool is landed in said nipple.

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**4,109,717**

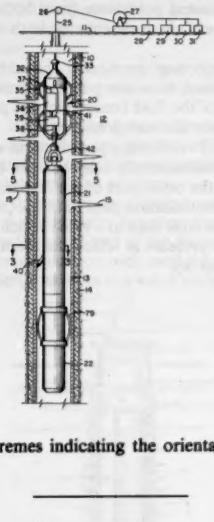
## METHOD OF DETERMINING THE ORIENTATION OF HYDRAULIC FRACTURES IN THE EARTH

**Claude E. Cooke, Jr., Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.**

**Filed Nov. 3, 1977, Ser. No. 848,067**
**Int. Cl.[2] E21B *47/06***
**U.S. Cl. 166—250** **12 Claims**

1. In a method of stimulating a subterranean formation surrounding a cased wellbore wherein a fluid having a temperature different from the normal temperature of the formation is injected into said formation at a pressure sufficient to form a vertical fracture therein, an improved method for determining the orientation of said fracture which comprises, prior to complete dissipation of the thermal effects created by the injection of the fluid into the formation (a) measuring the circumferential temperature of the interior of the well casing at an eleva-

tion proximate said formation and (b) determining direction of temperature extremes so measured, the diametrically opposed



temperature extremes indicating the orientation of said fracture.

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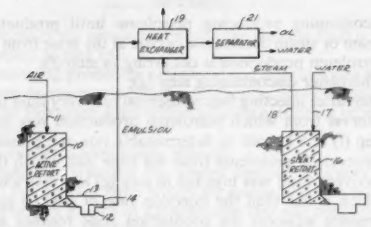
## 4,109,718
## METHOD OF BREAKING SHALE OIL-WATER EMULSION

**Robert S. Burton, III, Grand Junction, Colo., assignor to Occidental Oil Shale, Inc., Grand Junction, Colo.**

**Continuation-in-part of Ser. No. 644,513, Dec. 29, 1975, abandoned, which is a continuation of Ser. No. 481,975, Jun. 24, 1974, abandoned. This application Nov. 1, 1976, Ser. No. 737,556**

**Int. Cl.² E21B *43/24***

**U.S. Cl. 166—256** **16 Claims**




1. A process for recovering shale oil from an in situ oil shale retort in a subterranean formation containing oil shale, said in situ oil shale retort containing a fragmented permeable mass of particles containing oil shale, comprising the steps of:

advancing a retorting zone through the fragmented permeable mass for retorting oil shale in the fragmented permeable mass and producing liquid and gaseous products including shale oil, water vapor being present in the retorting zone;

condensing at least a portion of such water vapor on unretorted particles in the fragmented mass on the advancing side of the retorting zone whereby an emulsion of shale oil and water is produced;

withdrawing liquid and gaseous products including such emulsion of shale oil and water from the fragmented mass; and

holding the shale oil and water at a temperature of at least about 120° F for at least about one day for separating shale oil and water.

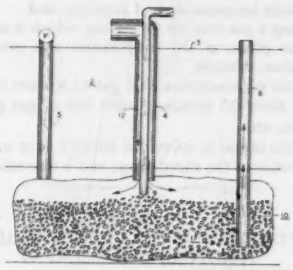
## 4,109,719
## METHOD FOR CREATING A PERMEABLE FRAGMENTED ZONE WITHIN A SUBTERRANEAN CARBONACEOUS DEPOSIT FOR IN SITU COAL GASIFICATION

**William L. Martin; Harry A. Wahl, both of Ponca City, Okla., and Gary C. Young, Pinole, Calif., assignors to Continental Oil Company, Ponca City, Okla.**

**Continuation of Ser. No. 673,566, Apr. 5, 1976, abandoned, which is a continuation-in-part of Ser. No. 582,063, May 29, 1975, abandoned. This application Dec. 5, 1977, Ser. No. 857,634**

**Int. Cl.² E21B *43/24, 43/26***

**U.S. Cl. 166—259** **7 Claims**



1. A method for producing gasification products from a subterranean coal stratum comprising the sequential steps of:

a. vertically traversing the coal stratum with a first wellbore and a second wellbore;

b. hydraulically fracturing and propping the coal between the first wellbore and the second wellbore in the lower vertical portion of the coal stratum therebetween;

c. igniting the coal at a locus near the first wellbore and near the propped fracture in the presence of a free oxygen-containing gas;

d. introducing through the first wellbore a free oxygen-containing gas to the ignited locus of the coal to effect gasification of the coal and propagate a gasification zone through the coal along the fractured and propped zone between the first wellbore and the second wellbore to form a horizontally elongated combustion cavity between the first wellbore and the second wellbore with production of the gasified products of the combustion through the second wellbore;

e. positioning conventional explosives in the coal laterally adjacent to the horizontally elongated cavity and at least partially above the horizontal axis of the horizontally elongated cavity such that energy generated upon detonation of the explosives extends into the cavity;

f. detonating the explosives thereby causing the coal above and to the sides of the horizontally elongated cavity to be fragmented and to collapse into the cavity, thus creating a horizontally elongated rubblized zone of coal of relatively high permeability and porosity;

g. introducing a free oxygen-containing gas to the horizontally elongated rubblized zone by way of the first wellbore to combust the rubblized coal, with production of gasified production products through the second wellbore.

**4,109,720**

## COMBINATION SOLVENT-NONCONDENSIBLE GAS INJECTION METHOD FOR RECOVERING PETROLEUM FROM VISCOUS PETROLEUM-CONTAINING FORMATIONS INCLUDING TAR SAND DEPOSITS

**Joseph C. Allen, Bellaire, Tex., and David A. Redford, Fort Saskatchewan, Canada, assignors to Texaco Inc., New York, N.Y. and Texaco Exploration Canada, Ltd., Calgary, Canada**

**Continuation-in-part of Ser. No. 406,409, Oct. 15, 1973, abandoned. This application Nov. 9, 1976, Ser. No. 740,281**

**Int. Cl.[2] E21B *43/22, 43/24***

**U.S. Cl. 166—269** **39 Claims**

20. A method for recovering petroleum including bitumen from a subterranean, viscous petroleum-containing formation including a tar sand deposit penetrated by at least one injection well and by at least one production well, said wells being in fluid communication with the formation, comprising:

a. injecting a solvent for the formation petroleum into the formation, the solvent being entirely in the liquid phase at formation temperature and pressure, and

b. injecting a gas into the formation, which is entirely in the gaseous phase at the temperature and pressure of the formation, wherein

c. the ratio of noncondensible gas to solvent is from about 0.5 to about 35 standard cubic feet of gas per gallon of solvent, and

d. the ratio of gas to solvent is initially at or near the maximum value of the stated range and is decreased with time.

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**4,109,721**

## METHOD OF PROPPANT PLACEMENT IN HYDRAULIC FRACTURING TREATMENT

**Marion L. Slusser, Arlington, Tex., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed Sep. 12, 1977, Ser. No. 832,699**

**Int. Cl.[2] E21B *43/26***

**U.S. Cl. 166—280** **8 Claims**

5. In a method of hydraulically fracturing a subterranean formation penetrated by a well wherein said formation has previously been treated to form a vertical fracture therein and a proppant pack deposited in the lower portion thereof, the improvement comprising:

(a) injecting via said well into said formation a slug of liquid containing fluid loss additives to deposit said fluid loss additives along the upper surface of said proppant pack and seal said upper surface of said proppant pack; and

(b) injecting via said well into said formation a high fluid loss fracturing fluid having proppants suspended therein at a pressure and in an amount sufficient to extend said fracture further into said formation and prop said extended portion of said fracture.

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**4,109,722**

## THERMAL OIL RECOVERY METHOD

**Richard H. Widmyer, and Jack H. Park, both of Houston, Tex., assignors to Texaco Inc., New York, N.Y.**

**Filed Apr. 28, 1977, Ser. No. 791,802**

**Int. Cl.[2] E21B *43/24***

**U.S. Cl. 166—281** **12 Claims**

1. A method for recovering viscous petroleum from a subterranean, permeable, viscous petroleum-containing formation comprising:

(a) penetrating the formation with at least one well and forming a relatively impermeable barrier adjacent the well and extending outwardly from the well into the formation;

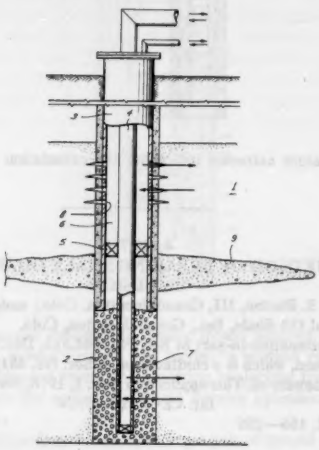
(b) establishing within the well two separate fluid flow paths from the surface of the earth, the first path being in fluid communication with at least a portion of the part of the petroleum formation above the barrier and the second flow path being in fluid communication with at least a portion of the part of the formation below the barrier;

(c) injecting a heated thermal recovery fluid comprising steam into both the upper and lower portions of the formation via both communication paths for a predetermined period of time;

(d) producing heated petroleum from both the upper and lower portions of the formation via both of the communication paths;

(e) thereafter injecting the heated thermal recovery fluid comprising steam into one portion of the formation by means of one of the fluid communication paths at a known or determinable rate and pressure;

(f) simultaneously recovering petroleum at a predetermined rate which is substantially less than the injection rate of step (e) from the other part of the formation by means of the other communication path until the pressure adjacent the production zone rises to a value which is from 50 to 90 percent of the pressure at which the thermal fluid is being injected in step (e);



(g) continuing producing petroleum until production of steam or steam condensate occurs at the zone from which petroleum production is occurring in step (f);

(h) thereafter discontinuing step (g);

(i) thereafter injecting heated thermal recovery fluid into the interval from which petroleum production was taken in step (f) at a known or determinable rate and pressure;

(j) recovering petroleum from the zone into which thermal recovery fluid was injected in step (e) at a restricted rate which is less than the injection rate of step (i) until the pressure adjacent the production zone reaches a value from 50 to 90 percent of the heated thermal recovery fluid injection pressure; and

(k) continuing producing petroleum from the formation in step (i) until steam or steam condensate is being produced with petroleum.

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**4,109,723**

## THERMAL OIL RECOVERY METHOD

**Richard H. Widmyer, Houston, Tex., assignor to Texaco Inc., New York, N.Y.**

**Filed Apr. 28, 1977, Ser. No. 791,801**

**Int. Cl.[2] E21B *43/24***

**U.S. Cl. 166—303** **10 Claims**

1. A method for recovering viscous petroleum from a subterranean, permeable, viscous petroleum-containing formation comprising:

(a) penetrating the formation with at least one well and establishing within the well two separate fluid flow paths from the surface of the earth, the first path being in fluid communication with at least a portion of the upper part of the oil formation and the second flow path being in fluid

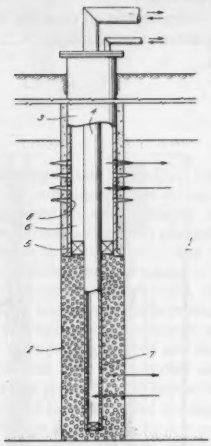
communication with at least a portion of the lower part of the formation;

(b) injecting a heated thermal recovery fluid comprising steam into both the upper and lower portions of the formation via both communication paths for a predetermined period of time;

(c) producing heated petroleum from both the upper and lower portions of the formation via both of the communication paths;

(d) thereafter injecting the heated thermal recovery fluid comprising steam into one portion of the formation by means of one of the fluid communication paths at a known or determinable rate and pressure;

(e) simultaneously recovering petroleum at a predetermined rate which is substantially less than the injection rate of step (d) from the other part of the formation by means of the other communication path until the pressure adjacent the production zone rises to a value which is from 50 to 90



percent of the pressure at which the thermal fluid is being injected in step (d);

(f) continuing producing petroleum and injecting steam until steam or steam condensate production occurs at the part of the formation from which petroleum is being produced in step (e);

(g) thereafter discontinuing step (f);

(h) thereafter injecting the heated thermal recovery fluid into the interval from which oil production was taken in step (e) at a known or determinable rate and pressure; and

(i) recovering petroleum from the zone into which steam was injected in step (d) at a restricted rate which is less than the injection rate of step (h) until the pressure adjacent the production zone reaches a value from 50 to 90 percent of the heated thermal recovery fluid injection pressure; and

(j) continuing producing petroleum in step (i) until steam or steam condensate is produced with petroleum.

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**4,109,724**

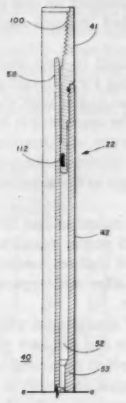
## OIL WELL TESTING VALVE WITH LIQUID SPRING

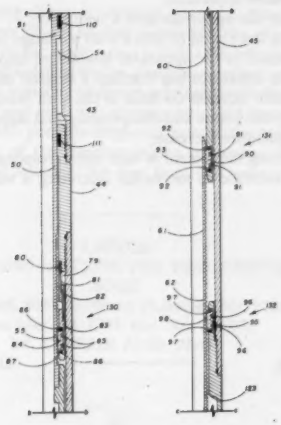
**Burchus Q. Barrington, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.**

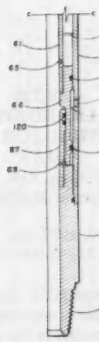
**Filed Oct. 27, 1977, Ser. No. 846,075**
**Int. Cl.[2] E21B *43/12***
**U.S. Cl. 166—315** **15 Claims**

**1.** A valve apparatus for use in an oil well having pressure and temperature gradients from the surface to a formation intersected by the well bore comprising:

a housing having a power port through the walls thereof and







a central bore longitudinally therethrough;

a power mandrel assembly in said central bore and arranged

in said housing for forming a sealed chamber between said housing and said power mandrel assembly;

a power piston dividing said chamber and exposed to pressure in said chamber on one side and the well bore pressure transmitted through said power port on the other side;

compressible liquid in said sealed chamber for providing operating spring force to said power piston, the volume of said liquid changeable with the pressure and temperature gradients as the apparatus is lowered into a well bore;

first means between said housing and said power mandrel assembly for allowing the volume of said compressible liquid to change as the apparatus is lowered into said well bore; and

valve operating means in said first means and operably connected to said power mandrel assembly for operating a valve in the oil well responsive to pressure changes in the well annulus after said apparatus has been lowered into said well bore.

7. A method of operating a valve apparatus in an oil well having temperature and pressure gradients from the surface to a formation intersected by a well bore comprising:

providing the apparatus with a compressible liquid whose volume is changeable with the pressure and temperature gradients from the surface to the well formation;

subjecting the liquid to a piston exposed on one side to the liquid and on the other side to the pressure external from the valve apparatus;

lowering the apparatus into a well bore;

allowing the piston to move with a change in the volume of the liquid as the apparatus is lowered into the well bore;

after the apparatus has reached a desired depth, exerting a pressure increase on fluid in the well bore;

moving said piston and compressing said liquid responsive to said pressure increase;

transferring movement of said piston responsive to the pressure increase to means for operating a valve in the well bore.

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**4,109,725**

## SELF ADJUSTING LIQUID SPRING OPERATING APPARATUS AND METHOD FOR USE IN AN OIL WELL VALVE

**Jim R. Williamson, Carrollton, Tex., and Floyd A. Gonzalez, Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.**

**Filed Oct. 27, 1977, Ser. No. 846,076**
**Int. Cl.[2] E21B *43/12***
**U.S. Cl. 166—315** **8 Claims**

1. An oil well valve operating apparatus containing a volume of compressible liquid comprising:

a housing having a chamber in the walls thereof for containing said compressible liquid volume;

piston means dividing the liquid filled chamber and arranged to move responsive to a pressure differential across said piston means;

metering means through said piston means for relieving a pressure differential across said piston means at a metered rate;

spring means arranged to work in conjunction with said piston means for returning said piston means to a predetermined position as a pressure differential is metered through said piston means by said metering means;

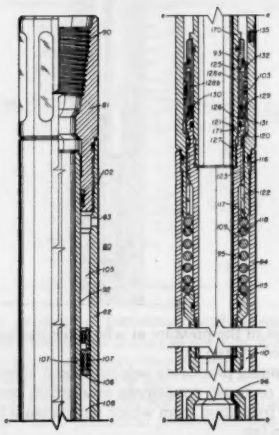
pressure transmitting means for transmitting pressure to one end of said liquid chamber responsive to the well annulus pressure; and

a power mandrel connected to said piston means for transmitting movement of said piston means to a valve which is activated by movement of said power mandrel responsive to a pressure change in the well annulus, which pressure change is imparted to the well annulus faster than the pressure change is relievable by said metering means.

8. A method of operating a valve in an oil well comprising:

providing a volume of compressible liquid in a chamber in an oil well apparatus;

dividing the compressible oil chamber with a piston having a metering means therethrough;



urging the piston in a first longitudinal direction to an initial position with a spring means;

transmitting pressure exterior of the apparatus to one side of the piston;

lowering the apparatus into the oil well to a predetermined depth;

metering changes in pressure and volume of the compressible oil through said metering means from one side of the piston to the other side;

changing the pressure in the well bore exterior of the apparatus at a rate faster than relievable by said metering means;

moving the piston in a second longitudinal direction against said spring means responsive to the pressure differential across said piston;

metering compressible oil through said metering means and moving said piston by said spring means in the first longitudinal direction back to its initial position; and

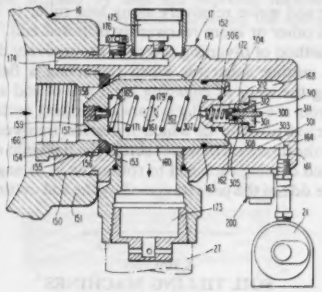
responsive to said motions of said piston, activating a valve in said oil well.

4,109,726

## GAS FIRE EXTINGUISHING SYSTEM

Arne Hansen, New City, N.Y., and George Troup, Hatboro, Pa., assignors to Chemetron Corporation, Chicago, Ill.

Division of Ser. No. 717,279, Aug. 24, 1976, Pat. No. 4,073,464.
This application Sep. 26, 1977, Ser. No. 836,575
The portion of the term of this patent subsequent to Feb. 14, 1978, has been disclaimed.
Int. Cl.[2] A62C *35/00*
U.S. Cl. 169—11 2 Claims



1. In a fire extinguishing system of the fluid distribution type, comprising at least one container of fire extinguishing fluid, a container valve connected to said container for controlling discharge of fluid therefrom, a first fluid conduit line connecting said container valve to a plurality of line valves, second fluid conduit lines connecting the line valves to gas dissemination points located in zones to be protected, sensing devices located in said zones for sensing a predetermined phenomenon in any of said zones and operating an actuator associated with said container valve for opening thereof and delivery of fluid to said first fluid conduit line, and second sensing devices located in the zones to be protected and operatively connected to respectively associated line valves for opening respectively associated said line valves in response to one or more second phenomenon sensing devices for delivery of fluid from the first fluid conduit line through associated said second fluid conduit lines in response to a predetermined phenomena level in associated said zones, and including means for maintaining said container valve in open condition after actuation thereof for continued flow of fluid therethrough irrespective of de-actuation of the actuator associated with said container valve, wherein said means for maintaining said container valve in open condition comprises a vent valve carried by the valve housing, and located for automatic actuation by a container valve piston in said container valve upon initial opening of the container valve by movement of the container valve by movement of the piston off its valve seat, an improvement wherein the vent valve comprises a plunger extending partially into the path of said piston for operative engagement by said piston upon its movement off its valve seat for outward movement of said plunger, said vent valve being automatically openable by said movement of said plunger

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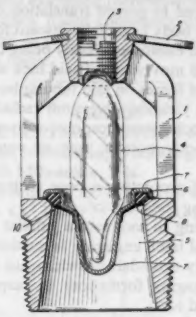
4,109,727

## DUAL-SEAL SPRINKLER SYSTEM

Eduard J. Job, Schimmelmannstrasse 25, 2070 Ahrensburg b., Hamburg, Germany

Filed Aug. 30, 1976, Ser. No. 718,401
Claims priority, application Fed. Rep. of Germany, Sep. 6, 1975, 2539703
Int. Cl.[2] A62C *37/14*
U.S. Cl. 169—41 7 Claims

1. In a sprinkler comprising a frame formed at one portion with a fluid passage terminating at an annular seat, a closure disposed across said passage adjacent said seat, an annular seal having a pressure-impacted side and another side exposed to ambient pressure and being disposed between said closure and said seat, and means disposed between another portion of said frame and said closure so as to hold said closure with said seal when said means is at ambient temperature and adapted to release said closure and said seal when said means is at elevated temperature, an improvement wherein said seal comprises a sealing membrane of deformable sheet-like film material and having its periphery lying against said seat and also having an annular portion adjacent the periphery trasversing a portion of the passage and lying against the closure, and a compressibly



elastic sealing ring disposed between a portion of said closure and the periphery of said sealing membrane, the closure bearing against said elastic sealing ring which resiliently presses the periphery of said annular sealing membrane against said seat to require the film material of the membrane to conform to the contour of the seat and seal thereagainst, said sealing membrane forming the pressure-impacted side of the seal and the annular portion of the membrane also traversing the elastic sealing ring and isolating the ring from the passage and the fluid therein.

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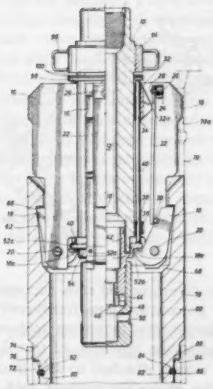
4,109,728

## APPARATUS AND METHOD FOR PROTECTING WELL BORE

Lawrence Sanford, 4047 Hollister, Houston, Tex. 77055

Filed Mar. 18, 1977, Ser. No. 778,956
Int. Cl.[2] E21B *23/00, 23/04*
U.S. Cl. 166—315 29 Claims



1. Apparatus for protecting a bore section formed by a well head assembly defining a generally upwardly facing landing therein, said protecting apparatus comprising:

a tubular bore protector body having external shoulder

means for seating on said landing and being configured to be disposed at least partially within and lining said bore section when said shoulder means is seated on said landing, said tubular body having an external annular groove therein, and said protecting apparatus further comprising a generally annular elastomeric body disposed in said groove and lock means comprised of substantially incompressible material disposed at least partially in said groove radially outwardly of said elastomeric body and having engagement surfaces lockingly engageable with the interior of said well head assembly, said engagement surfaces being configured to permit translation of upward forces on said tubular body to radially inward forces on said lock means, and said elastomeric body being operative to resist radially inward movement of said lock means in the presence of upward forces on said tubular body below a given magnitude but yieldable to permit radially inward movement of said lock means responsive to upward forces on said tubular body greater than or equal to said given magnitude.

24. A method of protecting a bore section in a well head assembly comprising the steps of:

inserting a running in tool into a tubular body, said body having internal latch engaging formations;

engaging laterally extendable latch means on said tool with said latch engaging formations to suspend said tubular body from said tool;

lowering said tool and said tubular body into said well head assembly;

seating said tubular body in said well head assembly;

landing a plug member on a plug seat in a tubular piston member in said tool;

laterally retracting said latch means from said latch engaging formations by exerting fluid pressure on said piston member;

raising said tool out of said tubular body.

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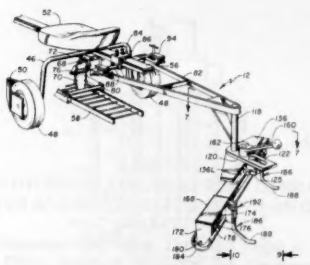
## 4,109,729

## DEVICE AND METHOD FOR DIVERTING ROLLS OF SOD DELIVERED FROM CONVENTIONAL SOD CUTTING APPARATUS

William C. Kaercher, Jr., 3615 Zenith Ave. N., Minneapolis, Minn. 55422

Filed Mar. 9, 1976, Ser. No. 665,211
Int. Cl.[2] A01B 45/04, 49/04
U.S. Cl. 172—1 15 Claims



2. A device for diverting sod rolls successively discharged from sod cutting apparatus when transversing a field of turf comprising a roller, means mounting said roller at an acute angle with respect to the direction of travel across the field, ground engaging means attached to said mounting means for elevating said roller above the ground, said mounting means being adjustable through an angular range sufficient to change the more forwardly disposed end of the roller to a more rearwardly disposed position and the more rearwardly disposed end of the roller to a more forwardly disposed position so that various roller angles can be achieved in order to divert sod rolls either to the left or to the right, and stop means for determining the more forwardly and rearwardly disposed end positions of the roller, said angle maintaining means including upper and lower tubular members, a horizontal plate element affixed to the lower end of said upper tube, a horizontal plate element affixed to the upper end of said lower tube, and means for clamping said plate elements in various angular relationships to maintain said roller in any of a number of selected angles, whereby the more forwardly disposed end of said roller successively engages one end of each sod roll, causing each of said rolls to be shifted into an angle corresponding to that of said roller and move relatively along said roller to a location beyond its other or more rearwardly disposed end.

12. A method of diverting sod rolls successively discharged from sod cutting apparatus when traversing a field of turf comprising the steps of engaging each roll of sod as it is discharged from the sod cutting apparatus, shifting each roll from its discharged position in which it resides transversely with respect to the direction of travel across the field into an angular position and causing each roll to roll while in its angular position to one side of the path traversed by the sod cutting apparatus.

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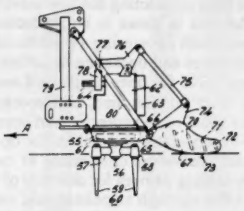
## 4,109,730

## SOIL TILLING MACHINES

Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

Filed Oct. 6, 1976, Ser. No. 730,258
Claims priority, application Netherlands, Oct. 8, 1975, 7511788
Int. Cl.[2] A01B 27/00, 35/18, 33/08
U.S. Cl. 172—54 12 Claims



1. A rotary harrow comprising a number of soil working members arranged in a row and mounted on a transverse frame portion, said members having tines that are rotatable about upwardly extending shafts, an elongated soil tilling member positioned to the rear of said row of soil working members and extending substantially throughout the working width of said row of soil working members, said soil tilling member comprising a support and at least one elongated element that extends substantially horizontal and transverse to the normal direction of travel of the machine, said tilling member being pivoted to the said frame, driving means being connected to rotate said soil working members, and said driving means comprising eccentric means that is connected to rock said tilling member about a substantially horizontal pivot axis during operation, said support together with element being moved upwardly and downwardly to repeatedly contact and crumble the upper surface of the ground worked by said members.

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## 4,109,731

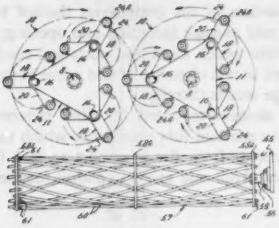
## SOIL CULTIVATING IMPLEMENTS

Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

Filed Jul. 21, 1976, Ser. No. 707,346
Claims priority, application Netherlands, Jul. 24, 1975, 7508821
Int. Cl.[2] A01B 33/06, 49/02, 27/00
U.S. Cl. 172—59 15 Claims

1. A soil cultivating implement comprising a frame and a plurality of soil working members supported on said frame,

said members being rotatable about upwardly extending axes and driving means connected to rotate neighboring members in relative opposite directions, said members each comprising arm means and arms of said arm means including at least one cultivating tool with soil working means that is freely rotatable about a respective upwardly extending axis and spaced therefrom, the rotating paths of the tools of neighboring members overlapping to work a continuous strip of soil, a roller attached to said frame and positioned to the rear of said soil working members, soil engaging means on said roller that engages broken soil worked by said soil working members during operation, said engaging means displacing the soil into differ-



ent directions from a location in register with a vertical plane that passes substantially midway between the axes of rotation of two adjacent soil working members and in a direction parallel to the direction of implement travel, said soil engaging means comprising a number of rod-like elements, which define a soil contacting periphery of said roller, said elements having bends located between opposite ends thereof and said bends positioned in substantial register with adjacent path regions that are worked by neighboring soil working members when viewed in the direction of implement travel, said elements being supported on spaced apart supporting members and at least one of said supporting members being located adjacent said bends.

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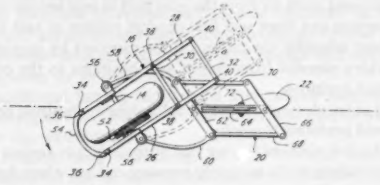
**4,109,732**

## SOIL TILLING APPARATUS WITH PIVOTAL DRAW FRAME

**Jesse F. Wright, Rte. 5, Box 284-X, Lufkin, Tex. 75901**

**Filed May 2, 1977, Ser. No. 792,927**
**Int. Cl.[2] B62D *51/06*; A01B *69/00***
**U.S. Cl. 172—258** **4 Claims**



1. A soil tilling apparatus, comprising
a traction wheel having an axle,
a traction frame supported from said traction wheel,
an engine mounted on said traction frame,
means connecting said engine to drive said traction wheel,
a draw frame including a longitudinally extending axis therethrough,
a pair of first hinges, each of which is mounted at one end of said axle,
a first arm and a second arm, each of which is pivotally mounted at one end thereof to one of said first hinges,
a pair of second hinges, each of which is mounted to the other end of one of said first and second arms,
a parallelogram linkage mounted on said pair of second hinges and pivotally connected thereby to said first and second arms,
one link of said parallelogram linkage extending between said pair of second hinges,
a second link of said parallelogram linkage opposite to said one link,
said draw frame pivotally connected to said one link and said second link and extending therebetween, said longitudinal axis of said draw frame continuing to point toward said traction wheel as said draw frame pivots with respect to said traction frame.

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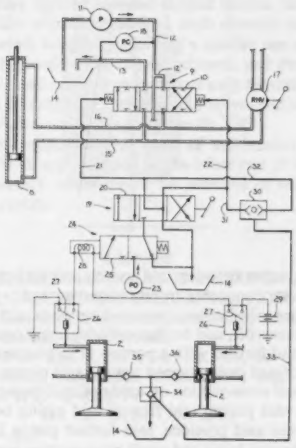
**4,109,733**

## TILT PREVENTING SYSTEM FOR DRILLS

**Robert E. Dummer, Milwaukee, Wis., assignor to Bucyrus-Erie Company, South Milwaukee, Wis.**

**Filed Aug. 29, 1977, Ser. No. 828,746**
**Int. Cl.[2] B23Q *5/027*; E21C *11/02***
**U.S. Cl. 173—4** **5 Claims**



1. In a tilt control for a drilling machine having hydraulic supporting jacks for the machine, a hydraulic drill feed motor, and a source of pressurized fluid, the combination comprising:
(a) a feed control valve between said source of pressurized fluid and said drill feed motor having one position for admitting fluid to said drill feed motor, and having a second position for isolating said drill feed motor from said fluid source with fluid entrapped within the motor;
(b) a control circuit for said feed control valve that sets the valve in a selected one of its positions, and
(c) pressure responsive means in pressure sensing connection with said hydraulic jacks that is joined in said control circuit to shift said feed control valve to its second position in response to a pressure change within said hydraulic jacks.

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**4,109,734**

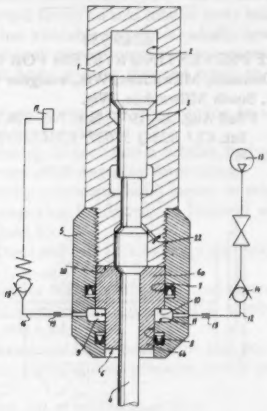
## PERCUSSION MACHINE

**Roger Montabert, 19 avenue des Colonnes, Bron (Rhone), France**

**Filed Nov. 3, 1976, Ser. No. 738,455**
**Claims priority, application France, Nov. 4, 1975, 75 34373**
**Int. Cl.[2] B25D *9/00***
**U.S. Cl. 173—114** **8 Claims**

1. A percussion machine comprising:
a solid housing body forming a cylinder;

a double-acting piston reciprocatable in said cylinder and forming a striking mass;
a tool aligned with and receiving impact from said striking mass;
means for retaining said tool on said body, said retaining means including:
a casing fixed to said body and forming a further cylinder;
a further piston surrounding said tool and slidable with said tool and relative thereto in said casing; and
an annular chamber defined within said casing between a face of said further piston turned away from said striking mass and a confronting face of said casing;
a source of an incompressible fluid under pressure connected to said chamber;



a check valve between said source and said chamber;
a reservoir connected to said chamber; and
a pressure-relief valve connected between said chamber and said reservoir, said further cylinder being coaxial with said tool and formed with a portion of large cross-section on a side of said casing turned toward said piston and a portion of small cross-section on a side of said casing turned away from said piston, said face of said casing being disposed between said portions, said further piston being stepped and having large and small cross-section portions respectively slidable in corresponding portions of said further cylinder and separated by said face of said further piston.

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**4,109,735**

## ROTARY SURGICAL DRIVER

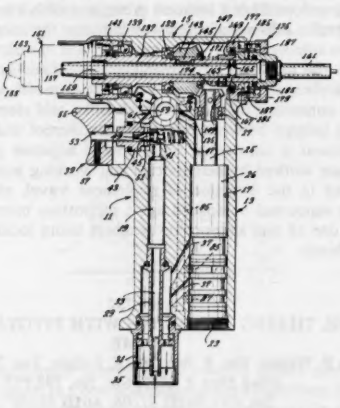
**John H. Bent, Carpenteria, Calif., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Continuation of Ser. No. 541,197, Jan. 15, 1975, abandoned, which is a continuation-in-part of Ser. No. 366,316, Jun. 4, 1973, abandoned. This application Aug. 2, 1976, Ser. No. 710,784**

**Int. Cl.[2] A61B** *17/18*

**U.S. Cl. 173—163** **5 Claims**

1. A driver for driving a surgical tool comprising:
a hand piece adapted to be held in the hand of a surgeon;
a barrel coupled to the hand piece and supporting a rotatable hollow shaft having a passage extending therethrough, the axis of said passage being generally transverse to the hand piece;
a reversible air motor mounted within said hand piece;
a drive shaft in said hand piece rotatably driven by said motor;
means interconnecting the drive shaft in driving relation to the hollow shaft;
said hollow shaft being adapted to receive and drive a surgical tool;
conduit means including first and second conduit sections for supplying air to the air motor to drive the air motor, the supply of air through the first conduit section to the air motor driving the air motor in a first direction and the supply of air through the second conduit section to the air motor driving the air motor in a second direction;
a reversing valve mounted on the hand piece, said reversing valve including a valve body having an inlet port connectible to air at supply pressure and an exhaust port for exhausting air at a pressure less than supply pressure;
said reversing valve providing a passage between supply air and said first conduit section in a first position and between supply air and said second conduit section in a second position, a valve element including an outer member and an inner member spaced from each other along at least a portion of the peripheries thereof to define an opening, said passage including said opening;
a chamber into which all of said ports and conduits open;
a sleeve fixed in said chamber of said valve body and having air passage means therein;
said valve element mounted for axial movement in said sleeve between said first position in which the valve element ports air from the inlet port to said first conduit section and from said second conduit section to said ex-



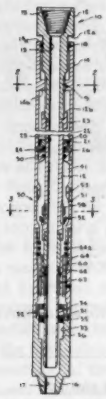
haust port and said second position in which the valve element ports air from the inlet port to said second conduit section and from said first conduit section to said exhaust port whereby the motor can be reversed by moving said valve element from one of said positions to the other of said positions;
said valve element being manually slidably movable between said positions thereof;
said valve element having first surface means against which air substantially at supply pressure can act when the valve element is in said first position to tend to hold the valve element in said first position;
said valve element having second surface means against which air substantially at supply pressure can act when the valve element is in said second position to tend to hold the valve element in said second position;
means in said hand piece to control the flow of air to said reversing valve;
detent means cooperating with said hollow member to receive and hold the shaft of a surgical tool; and
means located to the rear of said hollow member and cooperating with said detent to effect locking and release of the tool assembled to said driver.

4,109,736

## DOUBLE ACTING JAR

Derrel D. Webb, 802 Axilda, Houston, Tex. 77017, and Edwin A. Anderson, 1104 Chimney Rock Rd., Houston, Tex. 77056

Continuation-in-part of Ser. No. 694,911, Jun. 11, 1976, abandoned. This application Mar. 28, 1977, Ser. No. 782,011
Int. Cl.[2] E21B 1/10
U.S. Cl. 175—297 33 Claims



1. A hydraulic jar for incorporating in a drill string for use in a well bore comprising:

a. inner and outer telescopically arranged tubular members movable longitudinally relative to each other;

b. spaced seal means between said inner and outer tubular members forming separate first and second chambers for confining hydraulic operating fluid within each chamber;

c. jarring surfaces on said tubular members for jarring contact with each other to deliver an upward jar to the drill string;

d. longitudinally extending, annular first restriction means on one of said tubular members within the first chamber means;

e. first piston means on the other of said tubular members within the first chamber means;

f. said first piston means including fluid meter means operable when said first piston means is between the ends of said first restriction means for restraining relative longitudinal movement of said tubular members to an extended position, said fluid meter means operable after a predetermined relative longitudinal movement between said tubular members to release said tubular members for subsequent unrestrained relative longitudinal movement therebetween until said jarring surfaces engage and deliver an upward jar to the drill string;

g. additional jarring surfaces on said tubular members for jarring contact with each other to deliver a downward jar to the well string;

h. longitudinally extending, annular second restriction means on one of said tubular members spaced from said first restriction means within the first chamber means;

i. second piston means on the other of said tubular member within the second chamber means; and

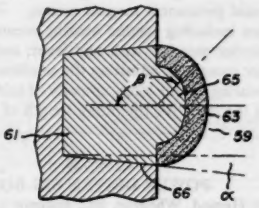
j. said second piston means including fluid meter means operable when said second piston means is between the ends of said second restriction means for restraining relative longitudinal movement of said tubular members to a telescoped position, said fluid meter means operable after a predetermined relative longitudinal movement between said tubular members to release said tubular members for subsequent unrestrained relative longitudinal movement therebetween until said additional jarring surfaces engage and deliver a downward jar to the drill string.

4,109,737

## ROTARY DRILL BIT

Harold P. Bovenkerk, Worthington, Ohio, assignor to General Electric Company, Worthington, Ohio

Filed Jun. 24, 1976, Ser. No. 699,411
Int. Cl.[2] E21B 9/36
U.S. Cl. 175—329 56 Claims




1. A drill bit comprising:

(a) a shaft;

(b) a crown fixed to one end of said shaft having a plurality of inwardly tapered recesses formed therein; and

(c) a plurality of cutting element, each element comprising

(1) a tapered, integral pin having a smaller one of the two ends disposed in one of said recesses, and the tapers of said pin and said one recess sized such that said pin is in a state of radial compression and is retained in said one recess by a self-locking friction-fit, and

(2) a thin polycrystalline layer of self-bonded diamond crystals directly bonded to the other end of said pin at an interface consisting of the material of said pin and said crystals.

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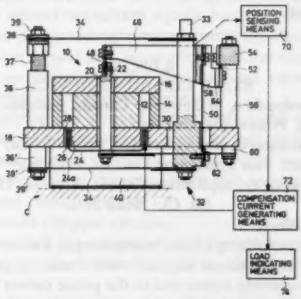
4,109,738

## WEIGHING APPARATUS INCLUDING LEVER-CONNECTED COMPENSATION COIL MEANS

Peter Kunz, Tann-Ruti, Switzerland, assignor to Mettler Instrument AG, Greifensee, Switzerland

Filed Feb. 8, 1977, Ser. No. 766,760
Claims priority, application Switzerland, Apr. 1, 1976, 4054/76; Apr. 1, 1976, 4055/76
Int. Cl.[2] G01G 7/00, 1/18
U.S. Cl. 177—212 17 Claims




1. In a weighing apparatus of the electromagnetic load compensation type including stationary pot-type permanent magnet means containing at one end an annular air gap, a pan carrier member connected for vertical displacement relative to said permanent magnet means, an annular compensation coil concentrically arranged for coaxial displacement within said air gap, means connecting said compensation coil with said pan carrier member, and means operable when said pan carrier member is displaced from a normal no-load position relative to said coil to generate an electromagnetic force for returning the

pan carrier member to its no-load position; the improvement wherein said means connecting said compensation coil with said pan carrier member comprises

(a) coil carrier means connected with said compensation coil;

(b) a horizontal lever connected at one end with said coil carrier means;

(c) means including first bearing means connecting said lever with said permanent magnet means;

(d) means including second bearing means connecting said pan carrier member with said lever; and

(e) spacer means for adjusting the position of at least one of said bearing means longitudinally of said lever, thereby to adjust the effective operating length of said lever.

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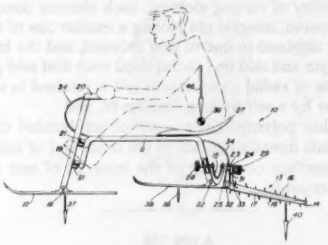
**4,109,739**

## POWER DRIVEN SKI-BOB

**Royce Hill Husted, Wheaton, Ill., assignor to Saroy Engineering, Wheaton, Ill.**

**Filed Jan. 6, 1977, Ser. No. 757,457**
**Int. Cl.[2] B62M *27/00***
**U.S. Cl. 180—5 R** **1 Claim**



1. A power driven ski-bob having a frame supported by a front steerable ski and a rear power driven ski sub-assembly, said sub-assembly having an anterior ski portion and a posterior tread carrying portion and being pivoted to the frame, the improvement wherein spring means, supported between said frame and said sub-assembly, are located and arranged so as to forcibly bias said posterior portion downwards and said anterior portion upwards in order to improve traction and bias load to the front steerable ski, thereby also improving steerability of said ski-bob.

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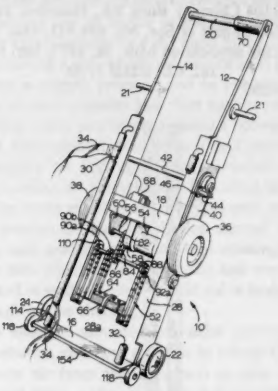
**4,109,740**

## STAIR CLIMBING DEVICE

**Roman Andruchiw, Willowdale, Canada, assignor to Step-Rite Limited, Willowdale, Canada**

**Continuation-in-part of Ser. No. 686,270, May 14, 1976, abandoned. This application Jun. 10, 1977, Ser. No. 805,290**
**Claims priority, application Canada, May 22, 1975, 227504**
**Int. Cl.[2] B62B *5/02***
**U.S. Cl. 180—8 A** **12 Claims**

1. A stair-climbing device comprising: a frame; wheel means rotatably mounted to support said frame; a prime mover; means operatively connected to the prime mover for engaging successive steps in a flight of steps to produce displacement of the device along the flight of steps; and arm means pivotally connected to the frame and having a downwardly extending sensing head disposed forward of the wheel means, said sensing head, as the wheel means rolls forward on a tread of a step toward the forward edge thereof, being adapted to contact said tread until said sensing head is beyond said forward edge whereuon said sensing head descends with resulting pivotal movement of said arm means, said arm means further having a downwardly facing friction surface disposed to the rear of said sensing head, said surface being spaced above said tread when said sensing head is in contact therewith and descending into contact with said tread upon said pivotal arm movement to



frictionally retard further forward movement of said wheel means.

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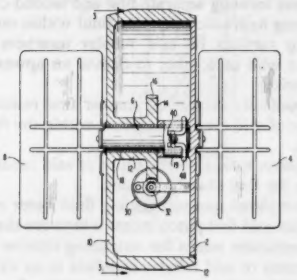
**4,109,741**

## MOTORIZED UNICYCLE WHEEL

**Charles L. Gabriel, P.O. Box 346, Mims, Fla. 32754**

**Filed Jul. 29, 1977, Ser. No. 820,377**
**Int. Cl.[2] B62K *1/00*; B62M *7/12***
**U.S. Cl. 180—21** **3 Claims**



1. A power operated unicycle wheel, comprising a fixed member, foot supporting pedals mounted on the fixed member for angular rocking movement with the fixed member, a rotatable member comprising a cup shaped body rotatably mounted on the fixed member and forming a hollow body therewith, power operated means within the hollow body connected to the rotatable member to cause rotation thereof, and means controlled by rocking movement of the foot pedals for energizing the power operated means and controlling the direction and speed of rotation thereof.

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**4,109,742**

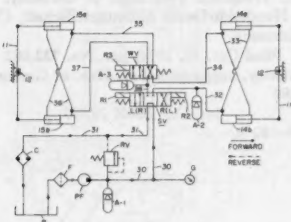
## STEERING AND WIDTH CONTROLS FOR EXPANDABLE TANDEM ROLLERS

**Louis F. Fairchild, Cedar Rapids, and Robert R. Brecht, Keystone, both of Iowa, assignors to Iowa Manufacturing Company, Cedar Rapids Iowa**

**Filed Feb. 24, 1977, Ser. No. 771,437**
**Int. Cl.[2] B62D *57/00***
**U.S. Cl. 180—20** **10 Claims**

1. In a self-propelled road machine having a body and a pair

of rollers disposed at spaced locations longitudinally of the body, each roller being articulated about an upright axis with respect to the body for dirigible movement and providing a substantially continuous ground engaging surface laterally of the machine, at least one of the rollers being driven for propulsion of the machine in either of two opposite directions along a road, and hydraulic circuit means to provide said dirigible movement both for lateral steering of the machine and for selectively adjusting the two rollers between tandem and echelon positions with respect to each other during travel of the machine along the road in either of said directions, said means including first and second hydraulic means operatively associated with respective ones of the rollers to provide said dirigible movement and a source providing flow of hydraulic fluid under pressure, the improvement in said hydraulic circuit means comprising: first valve means; first conduit means interconnecting said source and the first valve means for supply of presurized hydraulic fluid to the first valve means; second conduit means interconnecting the first valve means and the first hydraulic means; second valve means; third conduit means interconnecting the first hydraulic means and the second valve means; fourth conduit means interconnecting the second valve means and the second hydraulic means; fifth conduit means interconnecting the second hydraulic means and the second valve means; sixth conduit means interconnecting the first and second valve means; the first valve means selectively providing either an interconnection of the first conduit means with the second conduit means for circulating presurized hydraulic fluid from the first valve means serially to the first hydraulic



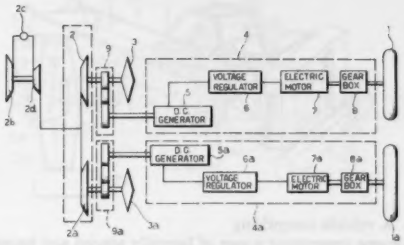

means, the second valve means, the second hydraulic means, the second valve means and back to the first valve means effective to provide for dirigible movement of the two rollers in opposite directions about said axes for steering of the machine in one lateral direction, or alternately an interconnection of the first valve means with the sixth conduit means for circulating presurized hydraulic fluid from the first valve means serially to the second valve means, the second hydraulic means, the second valve means, the first hydraulic means and back to the first valve means effective to provide for dirigible movement of the two rollers in opposite directions about said axes for steering of the machine in the other lateral direction; the second valve means selectively providing either an interconnection of the third with the fifth conduit means and the fourth with the sixth conduit means or alternately an interconnection of the third with the fourth conduit means and the fifth with the sixth conduit means, one of said second valve means interconnections being effective substantially immediately to cause the aforesaid dirigible movements of the rollers for steering of the machine in said lateral directions when the first valve means is also providing either one of its said interconnections, the other of said second valve means interconnections being effective substantially immediately to cause dirigible movement of the two rollers in the same direction about said axes for adjustment of the rollers between tandem and echelon positions when the first valve means is also providing either one of its said interconnections, the second valve means normally providing said one of its interconnections and optionally providing said other of its interconnections.

**4,109,743**

## PROPULSION UNIT FOR VEHICLES

**Giampiero Brusaglino, Turin, and Giovanni Savonuzzi, Moncalieri (Turin), both of Italy, assignors to FIAT Societa per Azioni, Turin, Italy**

**Filed Feb. 9, 1977, Ser. No. 767,191**
**Claims priority, application Italy, Feb. 24, 1976, 67411 A/76**
**Int. Cl.[2] B60L** *11/16, 11/04*
**U.S. Cl. 180—65 C** **4 Claims**

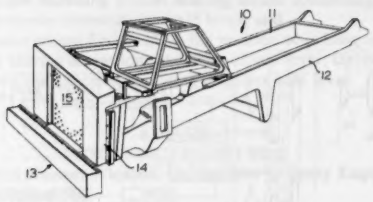



1. In a propulsion unit for motor vehicles comprising:
a biaxial turbine unit,
an electric generator connection to said turbine unit to be driven thereby and
an electric motor connected to at least one of the wheels of said vehicle,
a flywheel system interposed between said biaxial turbine unit and said electric generator to store kinetic energy from the rotation of said turbine unit, and
control means for controlling the excitation of the field windings of said electric generator and said electric motor, said control means comprising:
first and second control circuits each having first and second inputs thereto,
means for generating a first control signal the value of which depends on the position of the accelerator of said vehicle,
means feeding said first control signal to said first input of each of said first and second control circuits,
first and second sawtooth waveform generators producing first and second waveform signals having a descending ramp and an ascending ramp respectively, the instantaneous value of said first sawtooth waveform signal being at all times lower than the instantaneous value of said second sawtooth waveform signal,
means connecting the input of said first sawtooth waveform generator with said second input of said first control circuit, and means connecting the output of said second sawtooth waveform generator with said second input of said second control circuit,
first and second chopper circuits,
means connecting the outputs of said first and second control circuits to the inputs of said first and second chopper circuits,
means connecting the outputs of said first and second chopper circuits to the field windings of said electric generator and said electric motor respectively,
each of said control circuits producing an output pulse signal for the control of the conduction period of the associated one of said first and said second choppers commencing, in relation to the associate sawtooth waveform signal, at the instant when the sawtooth waveform signal has the same value as the signal present at said first input thereto, whereby to control the excitation of said field windings in dependence on the value of said control signal.

## 4,109,744
## FLEXIBLE ENGINE COWLING FOR CONSTRUCTION VEHICLES

David T. Ping, Decatur, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Jul. 1, 1977, Ser. No. 812,092
Int. Cl.[2] B60K *11/04*
U.S. Cl. 180—68 P 8 Claims




1. A vehicle comprising
a frame comprising a pair of laterally spaced and longitudinally extending frame members, a pair of laterally spaced and vertically extending side frame members and an upper horizontal cross frame member,
a radiator mounted on said frame,
an inverted U-shaped cowl assembly mounted adjacent to said radiator, including only a pair of laterally spaced and vertically disposed side members and a horizontally disposed upper member secured between upper ends of said side members,
means securing each of the side members to a respective one of the side frame members and the upper member of said cowl assembly to the upper cross frame member of said frame directly whereby the lower end of said cowl assembly remains in unsecured relationship with respect to said longitudinally extending frame members, and
a perforated guard assembly secured on said cowl assembly and disposed in covering relationship on a frontal side of said radiator.

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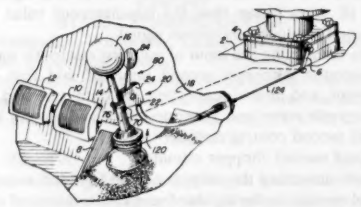
## 4,109,745
## MANUALLY OPERATED THROTTLE CONTROL FOR FOUR WHEEL DRIVE VEHICLE

Carl J. Hveem, 3221 N. 27th St., Phoenix, Ariz. 85016

Filed Mar. 10, 1977, Ser. No. 776,239
Int. Cl.[2] B60K *41/06*
U.S. Cl. 180—77 H 9 Claims



1. In an automotive vehicle having an engine compartment and driver's compartment separated by a firewall, a carburetor located in the engine compartment, and a gearshift lever in the driver's compartment, throttle control apparatus for controlling the carburetor throttle, comprising, in combination:
bracket means secured to the gearshift lever and including
a pair of plates spaced apart from each other,
a block disposed between the plates, and
bore means extending through the block;
lever means pivotally secured to the bracket means and including
a first arm disposed between the plates,
a second arm extending outwardly from the first arm and outwardly of the bracket means,
a first aperture extending through the lever means at the juncture of the first and second arms,
fastening means extending through the first aperture for securing the lever means to the bracket means and comprising means about which the lever means pivots with respect to the bracket means;
a cable housing extending between, and secured to, the firewall and the bore means of the bracket means;
a cable having a first end and a second end and secured at the first end to the carburetor throttle and extending through the cable housing and secured at the second end to the first arm of the lever means for controlling the throttle in response to movement of the second arm of the lever means; and
means for securing the cable to the first arm, including
a first slot on the first arm for receiving the cable,
a second aperture extending through the first arm and communicating with the slot, and
a button secured to the cable and extending into the second aperture.

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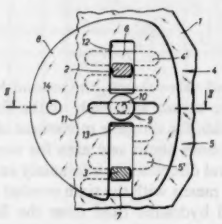
## 4,109,746
## DEVICE FOR BLOCKING THE STARTING OF VEHICLE ENGINES WITH ELECTRIC STARTER

Bert Breuer, Troisdorf, Fed. Rep. of Germany, assignor to Klöckner-Humboldt-Deutz Aktiengesellschaft, Cologne, Fed. Rep. of Germany

Filed Oct. 18, 1976, Ser. No. 733,082
Claims priority, application Fed. Rep. of Germany, Oct. 16, 1975, 2546286
Int. Cl.[2] B60K *28/00*
U.S. Cl. 180—82 A 3 Claims



1. A vehicle engine having an electric starter, and a transmission including at least one speed range shift lever and one group shift lever and two gear shifting gates spaced from each other respectively guiding said levers and arranged along substantially the same plane, said gear shifting gates including spaced slots for said at least one speed range shift lever and said at least one group shift lever, said transmission also including neutral control slots extending in one and the same direction, and said spaced slots for said at least one speed range shift lever and said at least one group shift lever extending at a substantially right angle to said neutral control slots, in combination with a shift plate covering said two gear shifting gates and provided with slot-shaped openings for the passage therethrough of said two shift levers, said slot-shaped openings extending in the longitudinal direction of and at least over the length of said neutral control slots, journalling means about which said shift plate is pivotable in a vertical axis and comprising a fixed vertical pivot pin, means defining an oblong opening extending transverse to said slot-shaped openings also to permit shifting of said shift plate and having said pivot pin journalled therein, and electric control switch means opera-

tively connected to said shift plate and operable in response to said shift plate moving into a first position relative to said control switch means corresponding to positioning of each of said levers in a neutral control slot to deactivate said starter.

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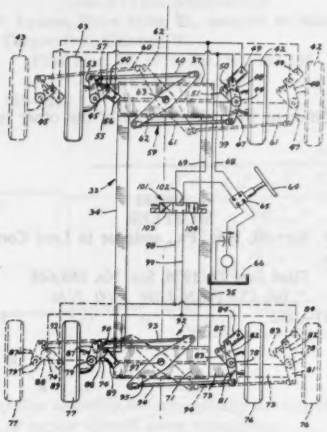
**4,109,747**
**STEERING MECHANISM**

John T. Hornagold, Arden Hills; Gary H. Beckley, Roseville, and Ram N. Rathi, New Brighton, all of Minn., assignors to American Hoist & Derrick Company, St. Paul, Minn.

Division of Ser. No. 686,058, May 13, 1976, Pat. No. 4,079,807.
This application Apr. 21, 1977, Ser. No. 789,640
Int. Cl.[2] B62D *5/08*
U.S. Cl. 180—140 18 Claims



1. A steering mechanism for a vehicle of the type wherein at least one of a pair of steerable wheels is laterally extendible and retractable relative to the center line of the vehicle frame, each steerable wheel having a steering arm rotatable with the wheel for steering rotation of the wheel, said steering mechanism including:

a flexible, extendible and retractable steering linkage;

a first steering arm associated with a first of said pair of steerable wheels and oriented to extend forward and outward relative to said vehicle center line;

a second steering arm associated with the second of said pair of steerable wheels and oriented to extend rearwardly and inward relative to said vehicle center line;

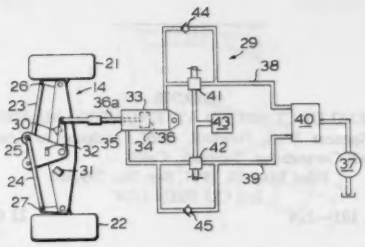
said steering linkage including a first rigid steering rod pivotally connected at one end of said first steering arm, a second rigid steering rod pivotally connected at one end to said second steering arm, a pivoted link member pivotally connected to said frame, the other end of said first steering rod pivotally connected to one end of said pivot link member and the other end of said second steering rod being pivotally connected to the other end of said pivoted link member to maintain controlled spatial relationship between the outer ends of the steering arms whereby in the execution of a turn, the inside of said pair of steerable wheels turns at a sharper angle relative to the center line of said vehicle frame than the outside wheel of said pair of steerable wheels.



**4,109,748**
**STEERING APPARATUS**

Dafydd W. Evans, Euclid, Ohio, assignor to Towmotor Corporation, Mentor, Ohio

Filed Feb. 28, 1977, Ser. No. 773,104
Int. Cl.[2] B62D *5/00*
U.S. Cl. 180—141 12 Claims



1. Steering override apparatus for a vehicle having a steering axle assembly movable between a first position at which the turning radius in a first direction of said vehicle is at a preselected minimum value, a second position at which the turning radius of said vehicle is infinite, and a third position at which the turning radius in a second direction of said vehicle is at a preselected minimum value, said second position being intermediate said first and third positions comprising:

means for controlling the turning radius of said vehicle in response to a predetermined operational rate by automatically restricting the movement of said steering axle assembly towards said first and third positions while leaving said steering axle assembly free for movement towards said second position, said control means including

a double acting cylinder having an actuator arm and left and right chamber portions and being pivotally connected to said steering axle assembly.

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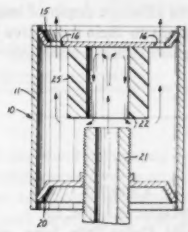
**4,109,749**
**MUFFLER**

Lawrence A. Sweet, Lakeland, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Nov. 9, 1976, Ser. No. 740,302
Int. Cl.[2] G10K *11/04;* F01N *1/08*
U.S. Cl. 181—230 4 Claims



1. A muffler for a compressed air tube heater comprising a cylindrical housing, an inlet cap fixed to one end of said housing and an air inlet nipple connected to and extending through said cap, an exhaust cap fixed on the other end of said housing and having a plurality of apertures adjacent its periphery and a cylindrical muffler pad for attenuating sound therein, said muffler pad being affixed at one end to the interior of said exhaust cap such that said plurality of apertures is outside the area of said muffler pad, the path through said muffler being serpentine in that air is directed through the center of said cylindrical muffler pad onto the exhaust cap, thence returned

back along the inner periphery of said muffler pad, through a gap formed by the free edge of said muffler pad and the top edge of said air inlet nipple, thence to atmosphere along the outer periphery of said muffler pad and the interior of said muffler housing through said plurality of apertures along the peripheral edge of said exhaust cap.

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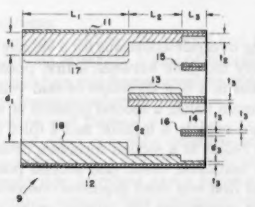
**4,109,750**

## ZENO DUCT SOUND ATTENUATING MEANS

**Leslie Spencer Wirt, Newhall, Calif., assignor to Lockheed Aircraft Corporation, Burbank, Calif.**

**Filed May 24, 1977, Ser. No. 799,953**
**Int. Cl.[2] F01N *1/04***
**U.S. Cl. 181—224** **22 Claims**



1. A sound attenuating duct operable over a frequency band spanning a given intermediate frequency, comprising:

boundary means defining a fluid passage having a substantially uniform cross-sectional area of the flow path therethrough, and further having a first dimension transverse of the flow path at a first location, which first dimension is that which provides optimum sound attenuation at said given intermediate frequency, and having second and third dimensions transverse of the flow path at respective second and third locations spaced apart from said first location, said second and third dimensions differing from said first dimension so as to provide effective sound attenuation over said absorption band; and,

sound absorbing liner means on at least a portion of an interior wall of said boundary means at said first, second, and third locations, said liner means having an essentially constant acoustic resistance over said absorption band, and the ratio of the effective depth of said liner means at each of said locations to their respective transverse duct dimensions, being substantially constant.

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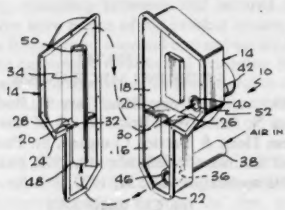
**4,109,751**

## NOISE SILENCER

**Dennis Frederick Kabele, Cedar Falls, Iowa, assignor to Deere & Company, Moline, Ill.**

**Filed Aug. 26, 1976, Ser. No. 718,091**
**Int. Cl.[2] F01N *1/00*; F02M *35/00*; G10K *11/00***
**U.S. Cl. 181—247** **9 Claims**

1. A silencer for use with an engine having an air intake and an exhaust comprising the combination of a first hollow pipe coupled to the air intake or the exhaust of the engine, a second hollow pipe having a length which is an even submultiple of the wavelength of noise at the lowest frequency of a range of frequencies to be attenuated, and a plurality of expansion chamber inlets and outlets coupled between the first hollow pipe and the second hollow pipe, each of the plurality of expansion chamber inlets and outlets having a length which is an even submultiple of the length of the second hollow pipe and




which is different from the lengths of the other inlets and outlets.

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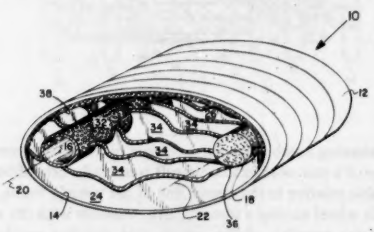
**4,109,752**

## MUFFLER

**Michael W. Ferralli, Erie, Pa., assignor to Lord Corporation, Erie, Pa.**

**Filed Jun. 22, 1976, Ser. No. 698,648**
**Int. Cl.[2] F01N *1/04, 1/00, 7/16***
**U.S. Cl. 181—252** **18 Claims**




1. A muffler comprising:

(a) a tubular shell having an interior circumferential surface which is acoustically reflective and which is successive sections taken transversely through the shell has at least a portion of its circumference shaped substantially to define at least part of an ellipse;

(b) means defining a fluid inlet into the shell;

(c) means defining a fluid outlet from the shell;

(d) means defining a fluid flow path that extends lengthwise through the shell between the inlet and the outlet along a first axis; and

(e) a sound absorptive treatment disposed within the shell along a second axis extending lengthwise through the shell,

the fluid flow path being defined such that communication is afforded between the flow path and the sound absorptive treatment, the treatment being spaced from the fluid flow path and spaced from at least a portion of the interior circumferential surface of the shell, the treatment also occupying within the shell a volume that is less than the total volume enclosed by the shell minus total volumes

occupied within the shell by the fluid flow path and the means defining the fluid flow path,

at least one of said first and second axes being defined by corresponding focal points of successive transverse sections taken through said portions of the circumference of the acoustically reflective shell surface, said axes being disposed relative to each other such that at least a portion of any sound emitted from fluid flowing along the flow path is reflected by said reflective shell surface to said sound absorptive treatment.

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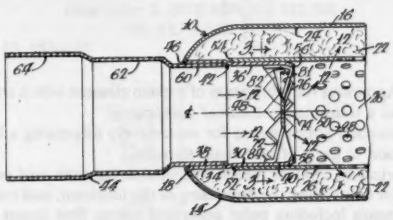
**4,109,753**

## MUFFLER ASSEMBLY

**Steven P. Lyman, Palos Hills, Ill., assignor to Midas-International Corporation, Chicago, Ill.**

**Filed Nov. 19, 1976, Ser. No. 743,136**
**Int. Cl.² F01N 1/10**
**U.S. Cl. 181—252** **22 Claims**



1. A muffler assembly for substantially limiting the acoustical level of engine exhaust gases, comprising:

a muffler having an elongated tubular housing, an elongated foraminous louver tube disposed within and circumscribed by said tubular housing, said louver tube cooperating with and spaced from said housing to define a tubular chamber therebetween, sound attenuating means disposed in said chamber to define a primary sound attenuating zone for substantially limiting the noise level of engine exhaust gases in response to the axial velocity of said exhaust gases, and said louver tube having an inlet and an outlet and defining a longitudinal axis and a plurality of apertures communicating with sound attenuating means;

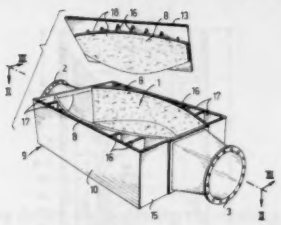
a diffuser positioned in communication with said louver tube for reducing the axial velocity of said exhaust gases passing through said muffler and for substantially creating a generally turbulent flow pattern in said muffler, said diffuser being of fluid impervious material and having a centrally-disposed imperforate baffle positioned about said longitudinal axis for substantially blocking and restricting the axial flow of said exhaust gases along portions of said longitudinal axis and including a plurality of deflector vanes extending generally radially outward from said centrally-disposed baffle and spaced from each other to define a plurality of generally radially extending apertures communicating with said louver tube, said vanes deflecting the flow of exhaust gases through said apertures and each vane having a gas contact surface facing generally toward said sound attenuating means for directing the flow of gases passing through said apertures into said sound attenuating means.

**4,109,754**

## NOISE ABSORBER FOR AIR OR GAS FLOWS

**Matti Purhonen, Helsinki, Finland, assignor to Temet OY., Helsinki, Finland**

**Filed Jan. 14, 1977, Ser. No. 759,520**
**Claims priority, application Finland, Jan. 21, 1976, 760137**
**Int. Cl.² F01N 1/04**
**U.S. Cl. 181—252** **7 Claims**



1. A noise absorber for an air or gas flow, including wall means defining a flow channel and inlet and outlet connections at opposite ends of said flow channel, said flow channel being substantially rectangular in cross-section and said wall means comprising two pair of opposed, curved walls, said walls extending from the inlet connection to the outlet connection and defining respective sides of said substantially rectangular corss-section, the opposed walls of one pair being concave towards each other and the opposed walls of the other pair being convex towards each otehr, and the noise absorber also comprising means defining compartments externally of said walls and functioning as resonator and/or absorption mufflers.

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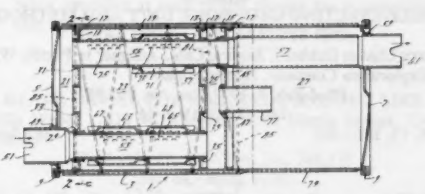
**4,109,755**

## NOISE ATTENUATOR

**Gary L. Grueneberg, Jerome, Mich., assignor to Tenneco, Inc., Racine, Wis.**

**Filed Oct. 4, 1976, Ser. No. 729,435**
**Int. Cl.² F01N 7/14, 7/16; F28D 7/00**
**U.S. Cl. 181—256** **4 Claims**



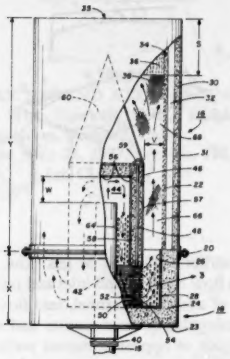
1. An exhaust gas sound attenuating device such as a muffler for combustion engines comprising an elongated metal housing having an outer wall with an outer metal surface and also having an inlet and an outlet for gas, gas passage and sound attenuating means in the housing for the passage of gas inside said housing from said inlet to said outlet and attenuating sound associated therewith, said outer wall being in heat and sound transfer relationship with gas flowing through the housing, a plurality of spaced sections of high temperature withstanding cordage extending around and against the outer metal surface of the outer wall, and an elongated outer cover layer of metal wrapped around and against the cordage and housing and engaging the cordage to hold it against the outer metal surface, said outer cover layer being spaced from said outer surface by said cordage and acting with the cordage to provide heat and sound insulation for said outer wall.

4,109,756

## HIGH FREQUENCY DIFFUSION MUFFLER FOR GAS JETS

Gerald Adrian Miller, Fountain Valley, and John Mitchell Zabsky, Santa Ana, both of Calif., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Nov. 17, 1976, Ser. No. 742,726
Int. Cl.[2] F01N *1/08*
U.S. Cl. 181—266 12 Claims



5. Muffler apparatus for attenuating sound of a high velocity compressible fluid jet comprising in combination:

(a) a housing having a jet inlet and outlet;

(b) means defining a flow path internally of said housing between said inlet and said outlet including a plurality of diffusion stages series arranged therein for successively reducing the velocity of a jet received at said inlet;

(c) said flow path defining means being operatively effective to maintain a jet flow in a condition of substantially laminar flow absent of large scale turbulence substantially throughout at least the flow path past said diffusion stages; and

(d) an acoustical absorbing composition of high frequency noise absorption properties exposed in said flow path in at least one of said diffusion stages.

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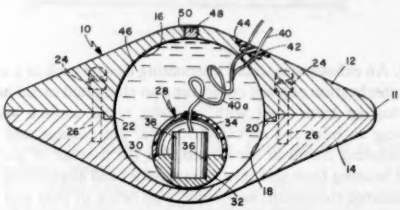
4,109,757

## SELF-ERECTING GEOPHONE UNIT AND METHOD AND SYSTEM FOR USING SAME

Harry Clinton Hebberd, Aurora, Colo., assignor to Pacific West Exploration Company, Denver, Colo.

Filed Feb. 9, 1977, Ser. No. 767,057
Int. Cl.[2] G01V *1/16*
U.S. Cl. 181—401 18 Claims



1. A self righting seismic detector assembly, said assembly comprising:

a sensing instrument having means defining a sensing axis having a preferred vertical orientation;

an outer housing having curved wall means defining a chamber; and

an inner housing for mounting said instrument in said preferred vertical orientation independent of the orientation of said outer housing, said inner housing having a high density curved base for defining a low center of gravity and the lower end of said inner housing when said vertical orientation is defined, said inner housing being supported at rest solely by said base normally slidably engaging said curved wall means and sliding to the lowermost point on said wall for assuming said vertical orientation.

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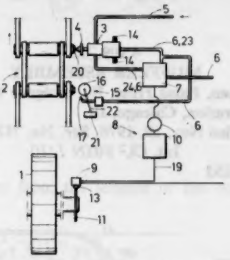
4,109,758

## LUBRICATING APPARATUS

Kalle Kolmonen, Nurmijärvi, and Esko Muukka, Kuopio, both of Finland, assignors to Kevotek Oy, Helsinki, Finland

Filed Dec. 28, 1976, Ser. No. 755,008
Claims priority, application Finland, Dec. 29, 1975, 753685
Int. Cl.[2] F01M *1/00*; F16N *29/00*
U.S. Cl. 184—15 A 7 Claims



1. Apparatus for lubrication of a chain element which travels around a transmission member comprising:

controlled nozzle means for successively dispensing a lubricant to parts of said chain element;

lubricating control means communicating with said nozzle for controlling the dispensing of the lubricant, said control means including pulse generator means, first means coupled to said pulse generator means and responsive to the position of the chain element to produce pulses to operate said control means and cause the nozzle to dispense the lubricant; and

cleaning means responsive to said first means to clean a part of said chain element prior to said part receiving lubricant from said nozzle means.

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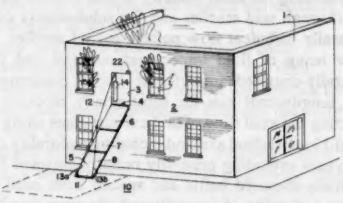
4,109,759

## EMERGENCY EXIT DEVICE

Otha G. Cundiff, Jr., Pontiac, Mich., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Feb. 4, 1977, Ser. No. 765,734
Int. Cl.[2] A62B *1/20*
U.S. Cl. 182—19 3 Claims



1. An emergency exit device for a building having an outside wall and at least two floor levels, said exit device comprising

a doorway type opening formed through the outside wall on an upper floor level of the building, said opening having a lower edge;

door means hingedly affixed to the building at the lower edge of the opening, said door means having a plurality of telescoping sections substantially juxtaposed when said door means is closed and forming an extended substantially planar incline when said door means is opened whereby said door means when open supports people leaving the building via the opening and functions as to slide to conduct them to the ground; and

door control means affixed to the door means and the building for lowering one end of the door means to the ground supporting the door means in its extended open condition from the lower edge of the opening to the ground and for supporting the door means in its closed condition as a door openable only from inside the building, said door control means comprising a cable affixed at one end to the door means, pulley means inside the building supporting the cable, said pulley means including a lockable pulley supporting the cable and lockable in position to prevent movement of said cable, and a weight affixed to the other end of the cable and functioning as a counterbalance to said door means.

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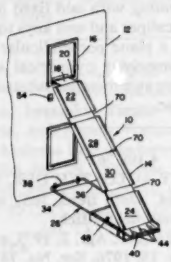
**4,109,760**

## EMERGENCY ESCAPE DEVICE

**Aldo Marra, 11 Wood St., San Francisco, Calif. 94118**

**Filed May 2, 1977, Ser. No. 792,703**
**Int. Cl.[2] A62B *1/20***
**U.S. Cl. 182—48** **10 Claims**



1. An escape device for emergency escape from an elevated position in a structure comprising:

elongated frame means rigidly associatable at a first end to said structure adjacent to ground level and removeably fixable in a first position at the second opposite end of said frame means to said structure adjacent said elevated position;

elongated collapsible-extensible slide means rigidly affixed at one end with said second end of said frame means and fixable adjacent said elevated position to said structure independent of said elongated frame means at the other second end of said collapsible-extensible slide means:

lock means operable from said elevated position for lockingly engaging said second end of said collapsible-extensible slide means with said structure immediately adjacent said elevated position and for releasing said second end of said elongated frame means so that said frame means is allowed to rotate through an arc to lie adjacent the ground level in a second position and extend said collapsible-extensible slide means whereby human escape may occur from said elevated position by sliding down the extended collapsible-extensible slide means;

and further wherein the collapsible-extensible slide means comprises a plurality of rigid members each hinged in an accordian fashion in an end-to-end relationship one with the next.

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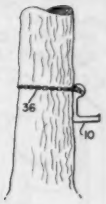
**4,109,761**

## PORTABLE CLIMBING DEVICE

**Selden W. Matlock, 3312 Breaux Dr., Lousiville, Ky. 40220**

**Filed Dec. 4, 1975, Ser. No. 637,573**
**Int. Cl.[2] E06C *7/08***
**U.S. Cl. 182—92** **25 Claims**




1. A climbing device for facilitating the climbing of a vertical structure, such as a tree, pole or the like, comprising:

a bracket, and

flexible, elongated structure-engaging means for wrapping around said structure and for securing said bracket to said vertical structure,

said bracket having a structure-engaging portion, a foot-supporting portion extending from one end of said structure-engaging portion, a camming surface for engaging said structure located at the other end of said structure-engaging portion, and means for releasably attaching said bracket to said flexible means, said camming surface and said attaching means operatively cooperating to increase the tension exerted by said bracket on said flexible means when said flexible means is wrapped around said structure and connected to said attaching means and said bracket is moved from a first position in which the camming surface engages said structure to a second position in which said structure-engaging portion engages said vertical structure, said attaching means including at least one positioning flange arranged at opposite lateral sides of said camming surface, each of said flanges extending laterally outwardly from said camming surface and being arranged at a predetermined angle with respect to a longitudinal axis of said structure-engaging portion, means for securing free ends of said flexible means to a respective flange and means being provided at each of the flanges for accomodating said securing means.

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**4,109,762**

## BRAKE DEVICE FOR A BICYCLE AND THE LIKE

**Philip Wood, 17818 W. Vineland Ave., Monte Sereno, Calif. 95030**

**Filed Feb. 17, 1977, Ser. No. 769,778**
**Int. Cl.[2] B62L *1/00***
**U.S. Cl. 188—26** **8 Claims**

1. A brake device for a vehicle having a hub rotatably mounted on the vehicle frame for supporting a wheel, said brake comprising, in combination:

an annular backing plate having a center opening;

an annular pressure plate having a center opening and being mounted on said backing plate for movement towards and away from said backing plate;

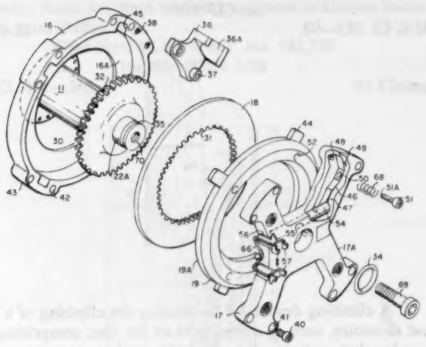
means mounting said backing plate and pressure plate concentric to said hub in a position stationary to the vehicle frame;

an annular brake disc having a center opening and being positioned between said backing plate and said pressure plate;

means mounting said brake disc concentric to said hub for rotation therewith while permitting movement in the axial direction relative to the hub; and

actuating means mounted on the backing plate in contact with said pressure plate for moving the pressure plate and

brake disc towards the backing plate to squeeze the brake disc therebetween and effect a braking action on the brake disc and the attached hub which when no braking action



is effected, the brake disc will move axially to seek a position out of contact with the backing plate and pressure plate.

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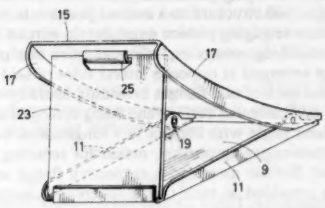
**4,109,763**

## WHEEL STOP APPARATUS

**Takayuki Sugino, 52 Murauchishimo, Karasumori-cho, Nakamura-ku, Nagoya-shi, Aichi-ken, Japan**

**Filed May 2, 1977, Ser. No. 792,665**
**Claims priority, application Japan, Feb. 14, 1977, 52-15689**
**Int. Cl.[2] B60T *3/00***
**U.S. Cl. 188—32** **3 Claims**



1. A foldable wheel stop apparatus comprising a bottom plate of plate material approximately rectangular in shape, which includes side flanges bent up along both its opposite sides of nearly constant width and an end flange bent up along its intermediate side of nearly constant width; a stopper plate of plate material approximately rectangular in shape, which includes side flanges bent down along its opposite sides of nearly constant width the adjacent ends of said side flanges of one of said plates being formed with punched out holes, and the adjacent ends of said side flanges of the other of said plates being formed with projections extending toward said holes, said projections being inserted into said holes whereby said stopper plate is pivotally attached to said bottom plate; a bearing member punched from the surface of said stopper plate at the end of said stopper plate remote from said projections and holes oriented parallel to the pivot axis of said bottom plate with said stopper plate, and a support plate of plate material approximately rectangular in shape and slightly smaller in width and length than the width and length of said stopper plate rotatably attached at one of its ends to the bearing member of said stopper plate, said bearing member characterized by having been formed by cutting a lip from the plate material of said support plate and curved and projected downwardly, and said support plate defining an opening adjacent one of its edges with the curved portion of said bearing member extending through said opening to form a hinge between said support plate and stopper plate.

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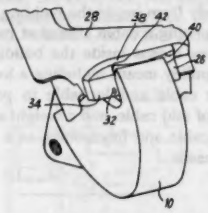
**4,109,764**

## FLOATING CALIPER DISC BRAKE AND A GUIDE KEY FOR THE SAME

**Jean-Jacques Carre, Montreuil, France, assignor to Societe Anonyme D.B.A., Paris, France**

**Filed Feb. 10, 1977, Ser. No. 767,581**
**Claims priority, application France, Mar. 12, 1976, 76 07118**
**Int. Cl.[2] F16D *55/224***
**U.S. Cl. 188—72.4** **1 Claim**



1. In a disc brake having a caliper straddling a rotary disc and sliding relative to a fixed member by means of two circumferentially spaced guide keys and an actuating means cooperating with the caliper to urge directly a first friction pad and, by reaction, a second friction pad into engagement with the rotary disc, the improvement in which said keys include guiding surfaces slidably engaging said caliper, said keys also including means facing and cooperating with said fixed member to provide for pivoting of said caliper and said keys together relative to said fixed member in a plane perpendicular to said rotary disc, and said means comprising cylindrical surfaces which engage said fixed member at a location substantially in alignment with said rotary disc.

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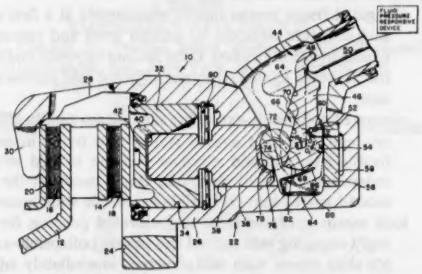
**4,109,765**

## MECHANICALLY ACTUATED DISC BRAKE

**Donald Dixon Johannesen, South Bend, Ind., assignor to The Bendix Corporation, Southfield, Mich.**

**Continuation of Ser. No. 564,507, Apr. 2, 1975, abandoned. This application Nov. 15, 1976, Ser. No. 741,655**
**Int. Cl.[2] F16D *55/08***
**U.S. Cl. 188—72.7** **7 Claims**



1. In a disc brake:
a rotor having a pair of friction faces;
a pair of friction elements, one of said elements being disposed adjacent each of said friction faces;
a fixed support;
a caliper slidably mounted on said fixed support and straddling said rotor, said caliper engaging each of said friction elements for urging the latter into braking engagement with their corresponding friction faces when a brake application is effected;
said caliper including a housing and actuating means for

effecting a brake application, said actuating means including a force transmitting member slidably mounted in said housing and adapted to engage one of said friction elements, a lever disposed within said housing and having a pair of camming surfaces, said camming surfaces being non-rotatable with respect to said lever, one of said camming surfaces being in rolling contact with a wall of said housing so that said one camming surface rolls relative to said housing and said lever pivots about a pivot point on said one camming surface, the position of said pivot point moving with respect to said housing as said one camming surface rolls on said wall of said housing, means operably connecting the other camming surface to said force transmitting member to urge the latter toward said rotor upon rolling of said one camming surface relative to said housing whereby said force transmitting member drives said friction elements into braking engagement with their corresponding friction faces to thereby effect a brake application, and means to actuate said lever;

said lever being actuable from a brake-released to a brake-applied condition, said camming surfaces being defined on opposite edges of one end of the lever;

said one camming surface defined on one edge of said lever being an arcuate curve adapted to engage the wall of said caliper;

said other camming surface being defined on the other edge of said lever and being disposed adjacent an arcuate depression, said means operably connecting said other camming surface to the force transmitting member including an element engaging said force transmitting member, said lever forcing said element out of said depression and against said other camming surface when the lever is actuated to thereby urge the force transmitting member toward the rotor.

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**4,109,766**

## DISC BRAKE

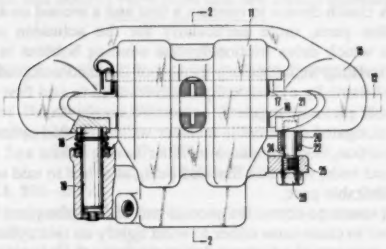
**Takehisa Inoue, Iwatsuki; Yutaka Ogawa, Tokyo; Hiroaki Sugita, Gyoda, and Namio Watanabe, Kuki, all of Japan, assignors to Akebono Brake Industry Co., Ltd., Tokyo, Japan**

**Filed Jun. 29, 1977, Ser. No. 811,301**

**Claims priority, application Japan, Jul. 6, 1976, 51-89758[U]; Jul. 6, 1976, 51-89759[U]; Sep. 17, 1976, 51-125093[U]**

**Int. Cl.² F16D *55/224***

**U.S. Cl. 188—73.4** **6 Claims**



1. A disc brake comrising;

a rotor to which the brake is to be applied;

a caliper having a thrusting device disposed on one side of said rotor and a reaction member disposed on the other side of the rotor;

a pair of friction pads which are to be pressed against both sides of the rotor by said thrusting device and said reaction member of the caliper;

a support for supporting said pair of friction pads;

a main guide pin which guides said caliper in the axial direction of said rotor, the main guide pin being secured to said support; and

an auxiliary guide pin which slidably engages with said support, the auxiliary guide pin being removably screwed to said caliper.

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**4,109,767**

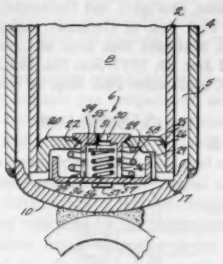
## COMPRESSION HEAD ASSEMBLY

**Srinath Nandyal, Bloomingdale, Ill., and Sellers B. McNally, Scottsdale, Ariz., assignors to Maremont Corporation, Chicago, Ill.**

**Filed Mar. 4, 1977, Ser. No. 774,499**

**Int. Cl.² F16F *9/06***

**U.S. Cl. 188—315** **1 Claim**



1. A shock absorber comprising an inner cylinder member, an outer tubular member surrounding said cylinder member, first and second end closure means for the opposite adjacent ends of said cylinder member and said tubular member defining between the exterior periphery of said cylinder member and the interior periphery of the outer tubular member an annular replenishing chamber, a piston slidably mounted within said cylinder member and having a piston rod extending therefrom outwardly in slidably sealed relation to said first end closure means, first and second mounting means on the outer end of said piston rod and the exterior of said second end closure means, a body of hydraulic fluid filling variable volume chambers within said cylinder member on opposite sides of said piston and partially filling said replenishing chamber, means in said piston for controlling the flow of hydraulic fluid between said variable volume chambers, and a compression head assembly for controlling the flow of fluid between said replenishing chamber and the variable volume chamber having an end defined by said second end closure means, the improvement which comprises said compression head assembly comprising a cup-shaped compression head of substantially uniform wall thickness mounted adjacent said second end closure means, said compression head including a cylindrical wall portion disposed in sealingly engaged relation to the interior periphery of said cylinder member, annularly spaced flange portions extending radially outwardly from the end of said cylindrical wall portion adjacent said second end closure means into engaged relation to the adjacent end of said cylinder member so as to prevent axial movement of said compression head, and a circular wall portion extending radially inwardly from the opposite end of said cylindrical wall portion, said circular wall portion having a central replenishing opening therein and an axially inwardly facing replenishing valve seat surrounding said replenishing opening, a replenishing valve member having a disk portion movable axially into and out of sealing relation with said replenishing valve seat, said disk portion having a central compression opening therein and a compression valve seat extending around the same which faces in an opposite axial direction from said replenishing valve seat, a compression valve member mounted for axial movement into and out of engagement with said compression valve seat, said replenishing valve member including a pair of valve stem portions extending from said disk portion through said replenishing opening, a spring retaining member abuttingly engaged with said valve stem portions, said valve stem portions including free end extensions bent over said spring retaining member to

secure the same in said abuttingly engaged relation, first spring means between said spring retaining member and said compression valve member resiliently urging the same into engagement with said compression valve seat and second spring means between said circular wall portion and said spring retaining member resiliently urging the latter and the replenishing valve member secured thereto in a direction to engage the disk portion thereof with said replenishing valve seat.

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**4,109,768**

## CURRENT COLLECTOR LINE

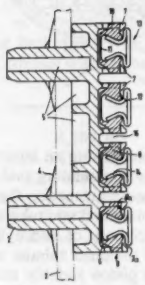
**Hans-Georg Fromme, Stuttgart, and Guckenhan Dieter, Sindelfingen, both of Fed. Rep. of Germany, assignors to Thyssen Aufzüge GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Jun. 29, 1977, Ser. No. 811,250**

**Claims priority, application Fed. Rep. of Germany, Jun. 29, 1976, 2629215**

**Int. Cl.² B60M *1/00***

**U.S. Cl. 191—22 R** **13 Claims**



1. A current collector line for electric trolley systems and the like and including assembly parts form-locking with a bus bar for clamp attachment of the bus bar to a guide rail for moving users comprising:

a support member having a plurality of cutouts defined by a rear wall and flexible locking blades,

adapter members positioned in said cutouts and retained therein by means of said locking blades, said adapter members being of generally C-shaped cross-section and having an outer shape conforming generally to the shape of said cutouts and an inner configuration wherein the open side is of reduced width and enlarges progressively inwardly,

a bus bar having a sliding contact surface and a pair of depending legs positioned in each of said adapter members, said legs each being progressively inwardly then outwardly turned with respect to said contact surface so as to have a shape conplementary to the inner configuration of said adapter members and be form-locked therein.

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**4,109,769**

## BRAKE ACTUATING MECHANISMS FOR BICYCLES

**Donald R. Darden, 519 Corday St. Lot 3, Pensacola, Fla. 32503**

**Filed Jan. 26, 1977, Ser. No. 762,681**

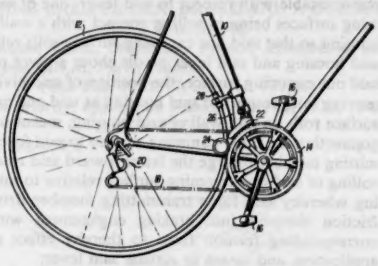
**Int. Cl.² B62L *5/00***

**U.S. Cl. 192—5** **16 Claims**

1. In combination with a bicycle having a frame, at least two wheels, at least one chain sprocket gear for meshing with a chain operatively associated with at least one of said wheels to rotate said at least one wheel, and at least one brake mechanism operatively associated with at least one of said wheels, an improved brake actuator comprising:

over-running clutch means attached to said frame in position to mesh with said at least one chain sprocket gear, for transmitting rotational motion from said at least one chain sprocket gear only when said at least one chain sprocket gear is rotating in the direction opposite to that required to rotate said at least one wheel to move said bicycle in the forward direction;

cable storage drum means adapted to be rotated by said over-running clutch means, said cable storage drum means



having a cable wound thereon, said cable being operatively connected to said at least one brake mechanism to actuate said at least one brake mechanism when said over-running clutch means transmits rotational motion from said at least one chain sprocket gear.

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**4,109,770**

## CLUTCH DEVICES

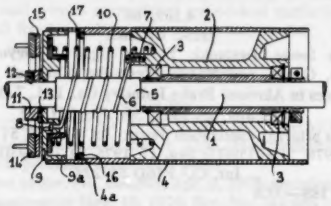
**René Perles, Rillieux-la-Pape, France, assignor to Verdol S.A., Caluire, France**

**Filed Mar. 17, 1977, Ser. No. 778,524**

**Claims priority, application France, Mar. 19, 1976, 76 08614**

**Int. Cl.² B60K *41/24***

**U.S. Cl. 192—12 BA** **9 Claims**



1. A clutch device to connect a first and a second co-axially rotatable parts, more particularly for the actuation of the drums which drive frictionally the winding bobbins in spinning, twisting and doubling frames, of the kind comprising:

a substantially cylindrical portion co-axial to said first rotatable part and angularly connected therewith;

an elongated deformable member wound on said cylindrical portion, said elongated member having a first and a second ends, with said first end being attached to said second rotatable part;

and means to act on the second end of said elongated member to cause same either to wind tightly on said cylindrical portion or to become loose thereon; the improvement which consists in said means comprising:

an intermediate member to which the second end of said elongated member is attached, said intermediate member being co-axial to said first and second rotatable parts, and freely rotatable and longitudinally displaceable with respect to same;

a main frictional abutment co-axial to said first rotatable part and angularly and longitudinally connected therewith;

spring means to resilient press said intermediate member against said main frictional abutment to cause said intermediate member to be frictionally driven by said first rotatable part and to tightly wind seid elongated member on said cylindrical portion to clutch said second rotatable part with said first rotatable part;

and pusher means to displace longitudinally said intermediate member to disengage same from said main frictional abutment to release said elongated member and to declutch said second rotatable part from said first rotatable part.

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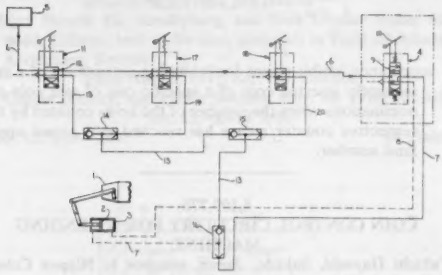
**4,109,771**

## SAFETY LOCKOUT FOR ENGINE CLUTCH

**Richard I. Strong, Green Bay, Wis., assignor to Northwest Engineering Company, Green Bay, Wis.**

**Filed Jun. 8, 1977, Ser. No. 804,637**
**Int. Cl.[2] F16D *25/00***
**U.S. Cl. 192—83** **4 Claims**



1. In combination with a mechanical drive clutch of the over-center type actuated by a double acting pneumatic piston-cylinder means supplied with pneumatic pressure from a source of such pressure through a main control valve selectively pressurizing either end of the cylinder, a remote safety lockout valve connected in the supply line from the source to the main control valve to provide for selective interruption of the pneumatic pressure to said main control valve, conduit means from said lockout valve to supply pneumatic pressure to the end of the power cylinder actuating the piston therein in a direction to disengage the clutch during said interruption of pneumatic pressure to said main control valve, means assuring exhaust of pneumatic pressure from the opposite end of the power cylinder during said selective actuation of said lockout valve, and means responsive to the pneumatic pressure from said lockout valve to prevent exhaust of pneumatic pressure through said control valve from said first named cylinder end.

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**4,109,772**

## VEHICULAR SINGLE SHAFT GAS TURBINE ENGINE POWER SYSTEM

**Bernard Brandt Poore, Waterloo, Iowa, assignor to Deere & Company, Moline, Ill.**

**Filed Oct. 17, 1975, Ser. No. 623,319**
**Int. Cl.[2] B60K *29/00***
**U.S. Cl. 192—0.092** **9 Claims**

1. A vehicular single shaft gas turbine engine power system comprising:

a single shaft gas turbine engine operating in response to an engine speed error signal provided by a vehicle control system and providing an engine velocity signal N1 in response to engine rotational velocity;

a fixed ratio reduction gear assembly coupled to receive rotational energy from the engine and output rotational energy with an increased torque and a decreased rotational velocity;

an automatic clutch coupled to receive rotational energy from the gear assembly and output the energy only when selectively engaged in response to a clutch control signal;

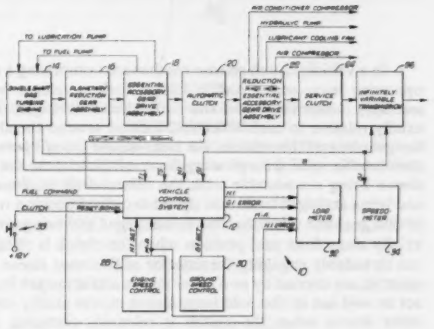
a first accessory gear drive assembly coupled between the reduction gear assembly and the automatic clutch to drive essential vehicle accessories in response to energy received from the reduction gear assembly;

a service clutch coupled to receive rotational energy from the automatic clutch and output the energy only when selectively engaged by a vehicle operator;

a second accessory gear drive assembly coupled between the automatic clutch and the service clutch to drive non-essential vehicle accessories in response to energy received from the output of the automatic clutch;

an infinitely variable transmission coupled to receive a ratio control signal and to receive rotational energy from the output of the service clutch, the transmission providing a rotational energy output for moving a vehicle at a rotational velocity ratio relative to the received energy in accordance with the ratio control signal and generating a ground speed signal G1 indicative of energy output rotational velocity;

a vehicle control system coupled to receive signal N1, signal G1, engine exhaust gas temperature information, an engine speed set signal (N1 SET), a ground speed set signal (G1 SET) and a manual-automatic select signal, the control system being operable in a manual mode commanded by the manual-automatic select signal to generate an engine speed error signal of sufficient magnitude to cause an engine speed indicated by the engine speed set signal, the control system being operative in an automatic mode commanded by the manual-automatic select signal to generate an engine speed error signal in response to engine



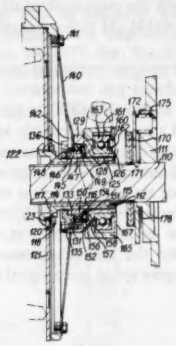
exhaust gas temperature causing an engine speed at which exhaust gas temperature is increased toward a desired maximum temperature as load increases, the control system being operable in response to a difference between commanded and actual engine speed and the ground speed set signal to generate a transmission ratio control signal indicative of the magnitude of the ground speed set signal less the difference between commanded and actual engine speed (R ≈ G1 SET − N1 ERROR), and the control system being operable in response to engine velocity signal N1 to generate a clutch control signal commanding engagement and disengagement of the automatic clutch when engine velocity is greater than and less than predetermined engagement and disengagement engine velocities respectively; and

a load meter operable in a manual mode to indicate actual engine speed in response to signal N1, the load meter being further operable in an automatic mode to indicate actual engine speed in response to signal N1 in a low magnitude range of indication, to indicate actual engine speed plus ground speed cutback in response to signal N1 and a G1 ERROR signal equal to G1 SET − G1 in an intermediate magnitude range of indication, and to indicate a load induced reduction of engine speed below a maximum torque engine speed in response to the engine speed error signal in a high range of indication.

## 4,109,773
## RELEASE BEARING ASSEMBLIES FOR VEHICLE CLUTCHES

Raymond Higgerson, and David Parsons, both of Leamington Spa, England, assignors to Automotive Products Limited, Leamington Spa, England

Filed Nov. 18, 1976, Ser. No. 742,741
Claims priority, application United Kingdom, Nov. 21, 1975, 48017/75; Jan. 27, 1976, 3122/76
Int. Cl.² F16D *13/75, 13/54*
U.S. Cl. 192—111 A 15 Claims



1. In a vehicle clutch release mechanism comprising a clutch operating lever and a clutch release fork, a release bearing assembly comprising inner and outer sleeves arranged to slide axially relative to each other and located around the shaft of the gear box of the vehicle, the inner sleeve being operatively connectable with the operating lever of the clutch, the outer sleeve being connectable with the release fork of the clutch and being arranged to assume a predetermined position relative to said gear box when the clutch is engaged and being movable axially away from said position when the clutch is released, a nut threadably engaging the exterior of the inner sleeve, abutment means carried by said outer sleeve and arranged in use to act on said nut so that said inner sleeve moves axially with the outer sleeve when the clutch is released, clamping means arranged to engage said nut to hold said nut against rotation when the sleeves are moved axially during clutch release, and release means for releasing the clamping means from engagement with said nut as said outer sleeve approaches the predetermined position under the influence of the operating lever of the clutch, so that the nut can rotate, under the influence of an axially force derived from the operating lever, about the inner sleeve to allow the inner sleeve to move axially relative to the outer sleeve when the outer sleeve is in its predetermined position.

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## 4,109,774
## CONTROL SYSTEM FOR A VENDING MACHINE

Yukichi Hayashi, Sakado, Japan, assignor to Nippon Coinco Co., Ltd., Japan

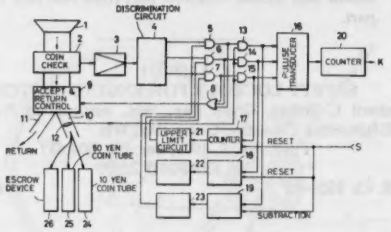
Filed Dec. 2, 1976, Ser. No. 746,804
Claims priority, application Japan, Dec. 5, 1975, 50/145277
Int. Cl.² G07F *1/02*
U.S. Cl. 194—1 C 5 Claims

1. In a vending machine capable of vending plural pieces of one or more articles in a single series of vending operations,

means for separately accepting coins of plural denominations and a control system, said control system comprising:

a plurality of counter means for counting the number of inserted coins by denomination;

a plurality of upper limit number detection means for detecting whether or not the number of coins counted by said counter means of the corresponding denomination has reached an upper limit number which is greater than one and is predetermined for respective coin denominations, and




acceptance inhibit means for inhibiting acceptance of a subsequently inserted coin of a specific one of said coin denominations when the number of the coins counted by the respective counter means has reached said preset upper limit number.

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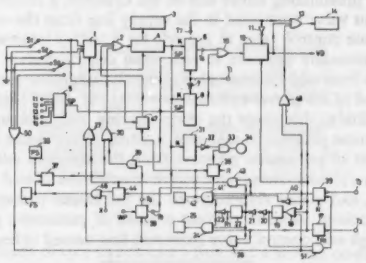
## 4,109,775
## COIN CONTROL CIRCUITRY FOR A VENDING MACHINE

Yukichi Hayashi, Sakado, Japan, assignor to Nippon Coinco Co., Ltd., Tokyo, Japan

Filed Oct. 27, 1976, Ser. No. 735,968
Int. Cl.² G07F *5/16*
U.S. Cl. 194—10 5 Claims



1. In a vending machine including coin control means for controlling the counting of inserted coins, calculation of change coin, payout of change coin and return of coin, and vender means for dispensing articles based on the signal from said coin control means, the improvement wherein;

said vender means comprises:

setting means for individually setting vend prices of respective articles; and

means for generating, upon depression of an article selection switch, a binary coded set vend price signal corresponding to said article selection switch: wherein

said coin control means comprises:

inserted coin encoding means for counting inserted coins and for producing binary coded signals indicative thereof,

a binary addition/subtraction circuit conditioned during coin insertion to add the binary coded signals indicative of inserted coins so as to produce a binary sum corresponding to the total value of said inserted coins,

comparator means for producing, upon comparison of said binary coded set vend price signal from said vender means with the binary sum from said addition/subtraction circuit corresponding to the value of inserted coins, a vend signal when vending is possible: and wherein;

said vender means further comprises:

means for starting dispensing of the article when said selection switch has been depressed and said vend signal has been received, and

subtraction enabling means, actuated when dispensing of said article has started, for conditioning said addition/subtraction circuit to subtract from the binary sum corresponding to the value of inserted coins the binary coded vend price signal, said comparator means thereafter producing a change enabling signal if the difference is greater than zero, indicating that change must be dispensed.

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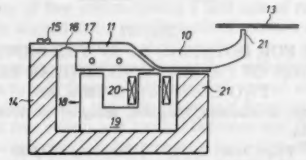
## 4,109,776
## APPARATUS FOR MARKING AN INFORMATION CARRYING MEDIUM

**Birger Henrik Ek, Sundbyberg, and Sven Gunnar Valter Stenudd, Lidingo, both of Sweden, assignors to Facit Aktiebolag, Atvidaberg, Sweden**

**Filed Nov. 9, 1977, Ser. No. 849,861**
**Claims priority, application Sweden, Nov. 10, 1976, 7612496**
**Int. Cl.² B41J 9/00**
**U.S. Cl. 400—124** **14 Claims**




1. In an apparatus for marking an information carrying medium wherein an elongated arm extends generally parallel to said information carrying medium and carries a marking device on one end thereof positioned to engage said information carrying medium, the arm is affixed to a leaf spring for resiliently biasing the arm in a first direction substantially normal to the surface of the information carrying medium, and a drive means is provided for moving the arm in a second direction opposite said first direction; the improvement wherein said leaf spring is bent, with one portion thereof being affixed to a first side of said arm facing said information carrying medium, and another portion of said leaf spring is affixed to the second side of said arm away from said information carrying medium.

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## 4,109,777
## TICKET PRINTER

**Allan S. Ottenstein, and John A. Callahan, both of Houston, Tex., assignors to Research Fuels, Inc., Houston, Tex.**

**Filed Aug. 2, 1976, Ser. No. 710,712**
**Int. Cl.² B41J 7/70**
**U.S. Cl. 400—124** **6 Claims**

1. A ticket printer apparatus for printing numbers on a ticket comprising:

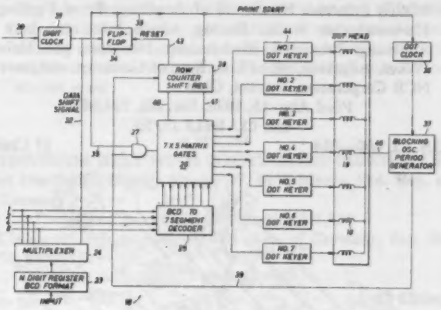
a ticket transport mechanism for receiving a ticket therein;

a plurality of solenoid operated impact imprinters aligned relative to said ticket transport mechanism, said imprinters forming dots on a ticket in a pattern to form a visually readable number;

motor means for advancing the ticket to enable said imprinter to form dots sequentially on the ticket to define a number;

an input for receiving a sequence of numbers to be printed which numbers are supplied as electrically encoded values;

circuit means connected to said input means for forming a set of dot signals which signals are applied to said imprinters in timed sequence to form the number on the ticket out of a set of dots in an X by Y pattern to form dots therein selected by the signals; and




power means furnishing power to said imprinters under control of said circuit means to operate said imprinters and which power means comprises a voltage flyback power source to drive said imprinters.

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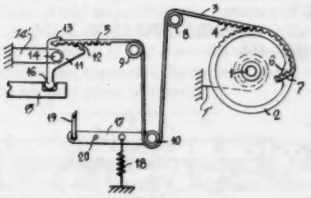
## 4,109,778
## TRANSMISSION MECHANISM, NOTABLY FOR TYPEWRITERS

**Raymond Clavel, Oulens, and Ulrich Menzi, Yverdon, both of Switzerland, assignors to Hermes Precisa International S.A., Yverdon, Switzerland**

**Filed Dec. 1, 1976, Ser. No. 746,207**
**Claims priority, application Switzerland, Dec. 8, 1975, 15901/75**
**Int. Cl.² B41J 23/02**
**U.S. Cl. 400—154.2** **5 Claims**



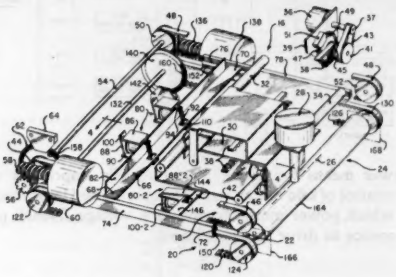

1. A transmission mechanism, notably for a typewriter, comprising a rotary member provided with a pulley, a flexible elongate connection fixed to the pulley and to an attachmemt piece, and a movable member bearing against the flexible connection between the attachment piece and the pulley to modify the path of the flexible connection and produce a corresponding angular displacement of the rotary member, wherein the pulley is formed of an at least partially toothed wheel, and the flexible connection is formed of a notched belt whose notches form a toothing engaging in teeth of the toothed wheel, the toothed wheel having means defining a discontinuity in its periphery, said discontinuity means being formed by a toothed lip extending towards the center of the toothed wheel and disposed facing a bearing surface, the distance between the bearing surface and the toothed lip corresponding to the thickness of the notched belt, whereby said toothed lip and notched belt may be readily engaged and disengaged in different relative positions for adjustment.

4,109,779

## MEDIA POSITIONING MEANS FOR A PRINTER

Karl A. Bauer; Peter F. Baur; Horst H. Biedermann; Andreas Madel; Friedrich Nitsch, all of Augsburg; Ernst Pechinger, Herbertshofen; Walter Koenig; Armin Ipfelkofer, both of Augsburg; Johann J. Rindsfuesser, Neusaess, and Helmut Weber, Augsburg, all of Fed. Rep. of Germany, assignors to NCR Corporation, Dayton, Ohio

Filed Aug. 13, 1976, Ser. No. 714,069
Int. Cl.[2] B41J *11/50*
U.S. Cl. 400—584 17 Claims



1. A media positioning means comprising:

first and second transport means positioned in opposed relation to each other and forming a common throat therebetween and having a reference line associated therewith for independently moving first and second media respectively, in said common throat towards and away from said reference line, said common throat having an open end to enable said first and second media to be inserted therein, and said reference line being located adjacent to said open end.

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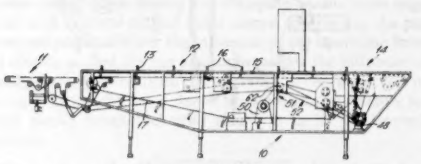
4,109,780

## CONVEYOR SYSTEMS WITH GATING ARRANGEMENT

Arthur Ernest Halsey, Horsham, England, assignor to Vacumatic Limited, Harwichm Essex, England

Filed Jul. 21, 1976, Ser. No. 707,389
Claims priority, application United Kingdom, Jul. 31, 1975, 32096/75
Int. Cl.[2] B65G *37/00, 21/14*
U.S. Cl. 198—466 20 Claims



1. A conveying apparatus comprising:

a first conveyor system; comprising an endless conveyor loop, means to guide the conveyor loop around a closed path including a horizontally extending run having an upstream end and a downstream end, means to drive the endless conveyor loop and move the horizontally extending run, means for cyclically extending and retracting the horizontal run of the path at one of said ends into and out of an article discharging position; and gating means located adjacent the upstream end of the horizontal run for providing a sequential flow of articles to the horizontal run;

a second conveyor system defining an article support surface;

a third conveyor system having a horizontally extending article support surface, article displacement elements, means for mounting the article displacement elements around an endless path part of which extends along the horizontally extending article support surface, and means for driving the article displacement elements around the closed path to sweep over the horizontally extending article support surface to displace articles along the horizontally extending article support surface;

the first conveyor system being located between the downstream end of the second conveyor system and the upstream end of the third conveyor system with its horizontally extending run in general alignment with the article support surfaces of the second and third conveyor systems, the upstream end of the article support surface of the third conveyor system and the one end of the horizontally extending run defining a space in their common plane, when said one end is in its retracted position; and means for coupling the cyclically operating means in timed relation with the drive means of the third conveyor system whereby the one end of the horizontally extending run is retracted to permit an article displacement member on the third conveyor system to pass through the space and then extend across the space to lie adjacent the third conveyor system until the next article displacement member approaches.

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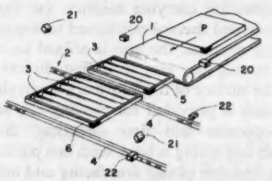
4,109,781

## DEVICE FOR ROTATING BY 90° THE MOVEMENT DIRECTION OF PALLETS AND SIMILAR BETWEEN TWO CONVEYING TRACKS

Hugo Moons, Bonheiden, Belgium, assignor to Alvey, Inc., St. Louis, Mo.

Filed Mar. 16, 1977, Ser. No. 777,958
Claims priority, application Belgium, Mar. 22, 1976, 016544
Int. Cl.[2] B65G *47/52*
U.S. Cl. 198—485 5 Claims



1. Device for changing the direction of movement by 90° of a pallet supported on conveying means which device comprises: a pallet delivery conveyor having a discharge end at a first level; roller conveyor means having conveying rollers forming a surface to receive a pallet from the discharge end of said delivery conveyor; support means for said roller conveyor means, said support means including slanting surfaces adapted to position said roller conveyor means at said first level and to permit said roller conveyor to descend to a lower level and in a direction at 90° to the direction of pallet delivery from said delivery conveyor first motor means operatively connected to said support means for moving said roller conveyor means between said first and lower levels; other conveyor means operatively disposed at said lower level and movable in a direction at 90° to the direction of pallet movement from said delivery conveyor; second motor means operatively connected to said conveying rollers in said roller conveyor means; a source of motive power connected to said first and second motor means, and including controllable means in the connection; and sensor means in control of said controllable means whereby said conveying rollers are driven at a first speed when a pallet is delivered thereto, are driven at a lower speed when a pallet comes close to being fully on said roller receiving surface, and are stopped when a pallet has reached a position fully on said roller receiving surface; and said roller conveying means is moved along said slanting surfaces by said first motor

means from said first level toward said lower level and in a direction to move with said other conveyor means.

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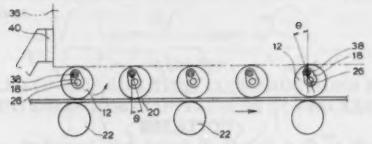
4,109,782

## ACCUMULATING ROLLER CONVEYOR

Isao Nakai, Nagoya, Japan, assignor to Rain Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Oct. 7, 1976, Ser. No. 730,324
Claims priority, application Japan, Jun. 6, 1976, 51-66360
Int. Cl.² B65G 13/07
U.S. Cl. 198—781 4 Claims



1. a roller conveyor for conveying an object comprising:
a frame;
a plurality of free rollers having a first axis of rotation;
a first pin aligned along said first axis of rotation and extending from each end of each free roller;
linkage means rotatably coupled each of said plurality of free rollers to said frame about a second axis of rotation substantially parallel and offset from said first axis of rotation of said free rollers and located between said first axis and said object, said linkage means including an eccentric member having one end rotatably coupled to said first pin and the other end of said eccentric member formed into a second pin aligned along said second axis of rotation and rotatably coupled to said frame; and
means for selectively imparting rotational force to each of said free rollers disposed on said frame, said means frictionally coupled to said plurality of free rollers.

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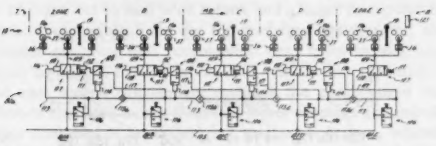
4,109,783

## FLUID CONTROL CIRCUIT AND METHOD FOR AN ACCUMULATOR CONVEYOR

Robert K. Vogt, Cincinnati, Ohio, assignor to The E. W. Buschman Company, Cincinnati, Ohio

Filed Aug. 2, 1976, Ser. No. 710,903
Int. Cl.² B65G 13/071
U.S. Cl. 198—781 17 Claims



1. A control circuit for an accumulator conveyor of the type having a plurality of zones between the inlet end and the discharge end, each zone including at least one selectively operable article propelling member for transferring an article on said conveyor through said zone, said control circuit comprising
a respective sensor means associated with each zone, each said sensor means being adapted to sense the presence or absence of an article in a respective zone on said conveyor,
a sub-circuit means for each zone, each sub-circuit means being activateable in response to an article sensed by the sensor means associated with said zone or the immediately upstream zone and operable to make live said article propelling member within said zone, and each sub-circuit means being deactivateable in response to the absence of an article to be sensed by said sensor means for said zone and by presence of an article in an immediately downstream zone to be sensed by a sensor means of the immediately downstream zone to make dead said article propelling member within said zone, thereby causing all of said zones to go dead when no article is on said conveyor and causing at least a subject zone to go live when an article is within that zone with no article in an immediately downstream zone.

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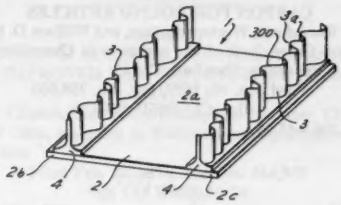
4,109,784

## CONVEYOR BELT WITH CORRUGATED SIDEWALLS

Karl Hartmann, Baerler Strasse 17, 4130 Moers, Fed. Rep. of Germany

Filed Jan. 21, 1977, Ser. No. 761,536
Claims priority, application Fed. Rep. of Germany, Jan. 24, 1976, 2602613
Int. Cl.² B65G 15/40
U.S. Cl. 198—821 11 Claims



1. An endless flexible conveyor belt, comprising an elongated bottom wall; and a pair of elongated sidewalls projecting from said bottom wall inclined thereto and having longitudinal edges remote therefrom said sidewalls defining with said bottom wall a material-accommodating cavity extending lengthwise of the belt, said sidewalls being laterally corrugated and each having a plurality of longitudinally spaced major folds, at least some of said major folds having at least one minor fold incorporated therewithin, each of said minor and major folds having a substantially constant cross-sectional shape and size over their height intermediate said bottom wall and said edges and said minor folds having cross-sectional dimensions which differ from those of said major folds, the presence of said minor folds reinforcing said sidewalls against lateral deflection and also enhancing the ability of said sidewalls to undergo longitudinal compression and expansion during movement of the belt from one into another plane of travel.

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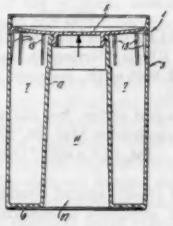
4,109,785

## CHILD RESISTANT PACKAGE

Walter G. Berghahn, and Martha L. Berghahn, both of Scotch Plains, N.J., assignors to Bristol-Myers Company, New York, N.Y.

Filed Nov. 21, 1977, Ser. No. 853,609
Int. Cl.² A45C 13/10, 13/18
U.S. Cl. 206—1.5 13 Claims



1. A child resistant package comprising in combination a

container body and removable cap means; said container body being open at the top and being provided with a closed bottom and outer side wall;

support means on said container body for supporting said cap means when positioned on said container body;

a passageway through said body having an opening to the outside of said container body and extending from a point on an outside wall thereof remote from said cap to a point adjacent said cap means whereby access may be had to said cap means from outside said container body through said passageway;

said passageway being wide enough to just about accommodate an average adult finger but longer than the average child's finger;

the distance from said passage opening to the point on the cap means on which pressure may be applied to pop the cap means off the container being longer than the average child's finger but about as long as an average adult finger.

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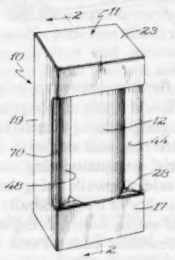
**4,109,786**

## CARTON FOR ROUND ARTICLES

**Harry I. Roccaforte, Western Springs, and William D. Pasquale, Downers Grove, both of Ill., assignors to Champion International Corporation, Stamford, Conn.**

**Filed Jan. 10, 1977, Ser. No. 758,033**
**Int. Cl.[2] B65D *5/50***
**U.S. Cl. 206—45.14** **3 Claims**



1. A combination comprising: a rectangular display carton having a front and back panel, said front panel having an aperture formed therein to display the contents of said carton; and an insert adapted to contact and provide restraint for a smooth cylindrical object to prevent rotation thereof out of registration with said opening in said carton, said insert comprising

a central panel,

a series of at least three panels connected by parallel vertical hinge lines on each side of said central panel and elongated offset strut panels formed in the second of said series of panels, said strut panels having article engaging edges, and

friction means applied to said inner surface of said central panel for contacting said cylindrical article to prevent rotation thereof.

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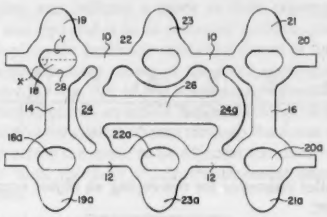
**4,109,787**

## MULTIPACKAGE AND CARRIER DEVICE

**Mindaugas Julius Klygis, Barrington, and Robert Charles Olsen, Streamwood, both of Ill., assignors to Illinois Tool Works Inc., Chicago, Ill.**

**Continuation-in-part of Ser. No. 602,619, Aug. 11, 1975, abandoned. This application Mar. 28, 1977, Ser. No. 782,275**
**Int. Cl.[2] A45C *11/00***
**U.S. Cl. 206—150** **8 Claims**

1. A package of closely spaced containers each of the type having a reduced generally cylindrical neck portion with outward shoulder means below the dispensing opening: and a carrier sheet of resilient deformable plastic material with apertures spaced in accordance with the number and spacing of the packaged containers and providing encircling bands receiving the neck portions of corresponding containers with edge portions of the apertures deflected upwardly and engaged beneath the shoulder means of included containers; each aperture having at least one portion of the periphery thereof of substantial length generally approaching a straight line and at least approximating the maximum length of an included aperture; the material of the carrier sheet adjacent said one portion of the periphery of each aperture extending transversely outwardly into a finger gripping tab including a base portion as part of the encircling band; each tab having a width along the base portion



thereof substantially coextensively spanning said one portion of the periphery of an adjacent aperture and an outwardly extending length dimension from said base portion relative to other portions of the carrier sheet material making up the encircling bands surrounding each aperture such as to provide increased transverse extent of material outwardly from said base portion for maximum resistance to stretching of each said one portion of the periphery of each aperture with a sharp downward deflection of each tab in external contiguous surface continuation of the upwardly deflected base portion against the neck portion of an adjacent container in the package of containers.

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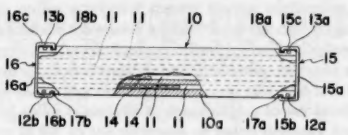
**4,109,788**

## COMPONENT CONTAINER

**Fuminori Hirose, Hirakata, and Teruo Shimizu, Katano, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**Filed Jul. 15, 1977, Ser. No. 816,198**
**Claims priority, application Japan, Jul. 16, 1976, 51-95419[U]**
**Int. Cl.[2] B65D *85/30***
**U.S. Cl. 206—329** **6 Claims**



1. A container for accommodating a plurality of wireless components, said container comprising:

casing means having a plurality of elongated parallel storage chambers therein for holding rows of said wireless components, said casing means having first and second opposing ends and said storage chambers extending between and opening at said first and second ends;

barrier means pivotably mounted across said first and second ends for alternatively closing and opening said openings into said storage chambers at said ends, each of said barrier means being comprised of an elastic wire member having a gate body extending across the end of said means in front of said storage chamber openings and an L-shaped arm extending from each end of said gate body along the sides of said casing means and pivotably connected to said

casing means, whereby pivoting said L-shaped arms upward swings said gate body away from said end openings to said storage chambers and allows said components to be inserted thereinto or withdrawn therefrom;

detent means at said ends of said casing means for engaging and holding said wire member in position across said storage chamber openings; and

said casing means further having guide grooves in the edges thereof adjacent said L-shaped arms and perpendicular to the direction of said arms when said gate body is across the end of said casing means, said guide groves shaped so that the insertion of a rod member into said guide grooves will force against said arms and cause said wire member to pivot.

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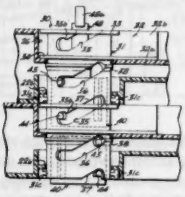
**4,109,789**

## SELF-CONTAINED LATCH CONSTRUCTIONS FOR INTERLOCKING CONTAINERS IN STACKED RELATION

**Lazzaro A. Fattori, and Joseph E. Fattori, both of Woodcliff Lake, N.J., assignors to Plastic Reel Corporation of America, Carlstadt, N.J.**

**Filed Sep. 28, 1977, Ser. No. 837,550**
**Int. Cl.[2] B65D *85/87, 21/02***
**U.S. Cl. 206—404** **18 Claims**



1. A locking unit for a container having a bottom and a separable fitted cover which is designed for nested stacking with other like containers, an opening formed in said container bottom, said locking unit being mounted in said cover and extending into said bottom opening when said cover is in a closed position on said bottom, said locking unit comprising an outer tubular member having a hollow bore formed as upper and lower chambers, cam means formed in the walls of the lower chamber, an extendable combination cam follower and latch means housed in said lower chamber and engaging said cam means, said upper chamber having companion elements for engagement by said latch means, and a finger manipulatable actuator accessible from the top surface of said cover, said actuator engaging said combination cam follower and latch means to impart movement thereto which, under control of said cam means engagement, extends the combination cam follower and latch means from said lower chamber and into the upper chamber of an underlying stacked container, wherein said latch means engage said companion elements, interlocking the two containers into a shipping unit.

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**4,109,790**

## SUPPORTING COVER FOR AN INK ROLL MEANS

**James A. Gottschlich, Bellbrook, Ohio, assignor to NCR Corporation, Dayton, Ohio**

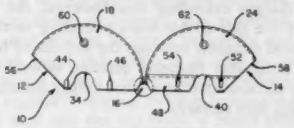
**Filed Jun. 13, 1977, Ser. No. 806,226**
**Int. Cl.[2] B65D *85/54, 13/00***
**U.S. Cl. 206—446** **11 Claims**

1. A supporting cover for an ink roll means comprising:

first and second sections and a hinge means to enable said first and second sections to be moved relative to each other to form a generally hollow container when in assembled relationship, to receive said ink roll means therein;

at least one of said first and second sections having means enabling said ink roll means to be rotatably supported in said supporting cover;

at least one of said first and second sections having a portion removed therefrom to expose a portion of said ink roll means when mounted in said supporting cover; and



said supporting cover having thereon means for restraining movement thereof when installed on a cooperating utilization device.

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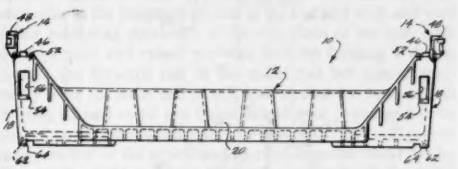
**4,109,791**

## NESTABLE AND STACKABLE CONTAINER ASSEMBLY WITH IMPROVED BAIL STRUCTURES OF MOLDED PLASTIC

**Stuart A. Clipson, Glendale, and Ralph H. Herolzer, Cincinnati, both of Ohio, assignors to Midland-Ross Corporation, Cleveland, Ohio**

**Filed Feb. 22, 1974, Ser. No. 444,967**
**Int. Cl.[2] B65D *21/06***
**U.S. Cl. 206—506** **12 Claims**



1. A nestable and stackable container assembly comprising a unitary container body of molded plastic material having a bottom wall and two pairs of opposed side walls integrally joined together and extending upwardly from the periphery of said bottom wall, said side walls being shaped to permit said container body to be nested within a like container body or the latter to be nested therein when disposed in vertically aligned relation therewith, one pair of said opposed side walls including a plurality of horizontally spaced vertically inclined sections extending above said bottom wall, each of said sections defining upwardly facing bail supporting surfaces disposed between the other pair of side walls, a pair of bail structures of molded plastic material mounted along the upper portion of said one pair of opposed side walls for movement between a stacking position wherein each extends inwardly of the adjacent interior surface of the associated side wall toward the opposed side wall in supported relation on the upwardly facing surfaces of said sections and a nesting position wherein each is disposed outwardly of the adjacent interior surface of the associated side wall, said bail structures when in said stacking position defining upwardly facing stacking surfaces for supporting a like container assembly when the container body thereof is disposed in vertically aligned relation above said container body, each side wall of said one pair including a plurality of horizontally spaced upwardly diverging panels extending upwardly and outwardly from said bottom wall between the aforesaid sections provided therein, each of said panels having inwardly directed flanges along the diverging edges thereof forming a part of the aforesaid sections which include a horizontally disposed ledge extending between the upper edges of adjacent flanges of adjacent panels to define said upwardly facing bail supporting surfaces, the aforesaid

sections of each side wall of said one pair including a plurality of horizontal elements, each extending horizontally between a pair of adjacent flanges in vertically aligned and spaced relation to the ledge associated therewith, the vertical spacing between said elements and said ledges being less than the nesting height of said container body, and a substantially vertically extending panel integrally interconnecting the inner edges of each associated ledge and horizontal element and the associated flanges extending therebetween, the portions of each of said one pair of side walls extending vertically below said horizontal elements between the associated flanges being open, said horizontal elements defining downwardly facing nesting stop surfaces and the aligned ledges defining upwardly facing nesting stop surfaces.

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**4,109,792**

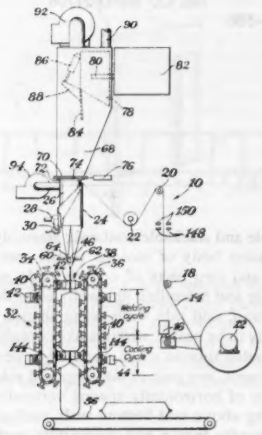
## METHOD OF PACKAGING AND PRODUCT MADE THEREBY

**Eddie Lee Greenawalt, and Lorenzo Dow Geren, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.**

**Continuation of Ser. No. 572,602, Apr. 28, 1975, abandoned, which is a division of Ser. No. 460,864, Apr. 15, 1974, Pat. No. 3,925,963, which is a continuation-in-part of Ser. No. 347,923, Apr. 4, 1973, abandoned. This application Dec. 6, 1976, Ser. No. 747,746**

**Int. Cl.² B65D *77/12*; B65B *1/02, 9/12***

**U.S. Cl. 206—525** **35 Claims**



1. In the method of producing bags by providing a flexible, generally vertical tube of thermally sealable material, periodically introducing product into the tube, and collapsing and transversely sealing the tube at spaced intervals to form a bag structure about each successive product load, the steps comprising: clamping the tube along first and second zones spaced in the vertical direction, the clamping pressure effecting a generally gas-tight closure of the tube along said zones, leaving the tube essentially free of mechanical clamping pressures between said zones, transversely parting the tube along a line between and remote from said clamped zones, separating the resultant parted edges to provide a space therebetween, preferentially bathing the parted edges, remote from said clamped zones, in gas streams, and venting said streams through the space between said edges, said streams imparting sufficient velocity pressure to the edges to urge the plies of the tube into intimate sealing contact, and simultaneously heating the streams to at least assist in raising the tube to sealing temperatures.

8. Form, fill and seal industrial size bags prepared according to the method of claim 1, and which are further characterized by side gussets, and at least a two ply construction.

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**4,109,793**

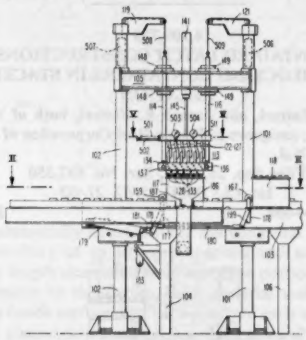
## AUTOMATIC AIR LEAK TESTING APPARATUS AND METHOD

**William J. Eberle, Reading, Pa., assignor to General Battery Corporation, Reading, Pa.**

**Continuation of Ser. No. 600,840, Jul. 31, 1975, Pat. No. 4,027,797, which is a division of Ser. No. 475,273, May 31, 1974, Pat. No. 3,938,368. This application Feb. 22, 1977, Ser. No. 770,889**

**Int. Cl.² B07C *9/00***

**U.S. Cl. 209—74 R** **5 Claims**



1. In an automotive battery production system, apparatus for selectively isolating automotive batteries comprising:

(a) a first conveyor means for advancing batteries and having defined thereon a battery processing position at which each battery is to be subjected to a preselected process;

(b) means for sequentially isolating and positioning each of said batteries at said battery processing position for a predetermined length of time; said means including means located at said battery processing position for positioning at said battery processing position each of said batteries in a first direction along a path which is transverse to the direction of advancement of said batteries;

(c) a second conveyor means for advancing select ones of said batteries, said second conveyor means communicating with said first conveyor means adjacent said battery processing position; and

(d) reject means responsive to results of said processes, for selectively moving batteries from said battery processing position along said path in the opposite direction with respect to said first direction to move said batteries from said first conveyor means to said second conveyor means.

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**4,109,794**

## NECKTIE RACK

**Stanley C. Samuel, and Esta Samuel, both of 26 Wellsley Rd., Rockville Centre, N.Y. 11570**

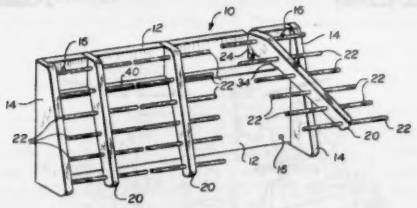
**Filed Sep. 13, 1976, Ser. No. 722,528**

**Int. Cl.² A47F *7/12***

**U.S. Cl. 211—13** **4 Claims**

1. A necktie rack including in combination a back element, an arm supported at its upper end from the back element, a pivot connection between the top of the arm and the back element on which the arm swings about a horizontal axis to move angularly with respect to the back element toward and from a horizontal position in which the arm extends forward, tie hangers carried by the arm and extending generally horizontally from both sides of the arm at spaced locations lengthwise of the arm, and bumper surfaces at the upper part of the arm and limiting downward angular movement of the arm to a position of rest extending outward at an acute angle to the back

element in a position where each of the spaced tie hangers is at a different horizontal spacing forward from the back element with the lowermost tie hanger furthest from the back element so that ties on the hangers have space below them, when the arm is against the back element bumper surface, into which each tie can hang freely and vertically with its front and back inside surfaces in direct confrontation with one another and without substantial interference from other ties on other tie hangers, characterized by the back element having a channel opening through the top of the back element and extending for the full front-to-back thickness of the back element at the upper part of the back element, the upper end of the arm extending into the channel, and the pivot connection between the arm and the back element being pins extending from opposite sides of the arm and into bearing surfaces in the opposite sides of said channel and characterized by the back element being a board of substantial front-to-back thickness, and the channel extending for a substantial distance downward from a top of the board, the upper end of the arm being of a width that fits into the channel with a running clearance so that the arm is held against transverse movement by the sides of the channel, the




pins that extend from the arm to the sides of the channel being a pin that extends from both sides of the arm and into the sides of the channel on opposite sides of the arm, the board having a groove in a rearward face thereof and of a width for receiving the portions of the pin that extend beyond the sides of the arm, said groove being of a depth less than the front-to-back thickness of the back board whereby the end of the groove provides a bearing surface that limits forward movement of the pivot pin and the arm when the arm is in its downwardly and forwardly extending position with said bumper surfaces in contact with one another, one of the bumper surfaces being on the back of the arm immediately below the lower limit of the channel when the arm is in contact with the other bumper surface which is part of the front surface of the back element below the bottom of said channel, the portion of the arm extending below the channel and pressing against the forward surface of the back board being in position to hold the pivot from moving rearwardly in the groove and the force exerted by a person swinging the arm outward at its lower end serving to hold the pins at the forward end of the groove whereby the axes of the pin remains at the forward end of the groove for all working positions of the arm.

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**4,109,795**

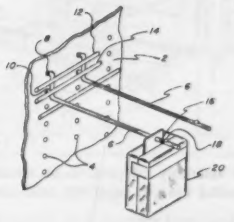
## DISPLAY RACK AND ASSEMBLY OF ARTICLES ON THE RACK

**Barry S. Konigsford, Mount Prospect; Kenneth Davidson, Libertyville, and Howard J. Marschak, Evanston, all of Ill., assignors to International Telephone and Telegraph Corporation, New York, N.Y.**

**Filed Jul. 14, 1975, Ser. No. 595,736**
**Int. Cl.[2] A47F 7/00**
**U.S. Cl. 211—57.1** **7 Claims**

1. An arrangement comprising a bracket having first and second means supporting said bracket at a first end, said bracket being formed as a substantially straight element having a given cross-sectional area, said bracket incorporating detent means at the second end, said detent means including a stop-notch of reduced cross-sectional area, cooperative with an adjacent protuberance of increased cross-sectional area, the latter facing toward the second end of the bracket, and a mounting member supporting a plurality of articles, said mounting member including an end telescopically engageable with the second end of said bracket to enable said articles to be slid along a linear path from said mounting member over the detent means onto the bracket.

7. A bracket for displaying and dispensing a plurality of articles, each of which is supported on a card having an opening, said bracket having spaced hooking members at the rear thereof for detachable securement to a pegboard to form a display rack, said bracket having a forwardly and longitudinally extending metal rod which is circular in cross-section with said metal rod having a depressed portion having a downwardly and angularly sloping surface terminating with the front thereof well into the rod body, a raised portion at the front of said depressed portion and rearward of the rod end, said raised portion having a wall surface extending from the




juncture thereof with the depressed portion substantially perpendicular to the longitudinal axis of the rod and with said wall surface extending upwardly of the top plane of the rod, both said depressed and raised portions thereby forming a detent adjacent the forward end of the metal rod but spaced rearwardly from the front end of said rod, so that the cards which are hung on said metal rod through said card openings will be retained on said metal rod solely by said detent but will permit ready removal of the article and its card from the metal rod by lifting such article and card vertically upwardly of the metal rod, the most forward of said plurality of cards adapted to be received in said depressed portion of said rod when said card engages said detent while said card is supported on said rod, the longitudinal axis of the front end of said rod coinciding with the longitudinal axis of the major portion of the rod so that each of the cards may be inserted on said rod in a linear direction.

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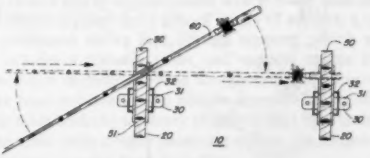
**4,109,796**

## ROD AND REEL STORAGE APPARATUS

**Robert C. Mitchell, 485 El Blanco Dr., Boise, Id. 83705**

**Filed May 20, 1977, Ser. No. 798,748**
**Int. Cl.[2] A01H 91/00**
**U.S. Cl. 211—60 R** **7 Claims**




1. Rod and reel holding apparatus comprising a pair of holders, each holder including;

a mounting bracket;

an upwardly extending arm rotatable about its longitudinal axis and removably attached to said bracket;

a loop assembly attached to the uppermost terminal free end of said arm, said loop assembly including at least one loop having an obliquely located slot at substantially the uppermost end thereof, said loop adapted to receive a rod inserted downwardly in alignment with said slot and adapted to prevent upward removal of the rod unless aligned with said slot.

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**4,109,797**

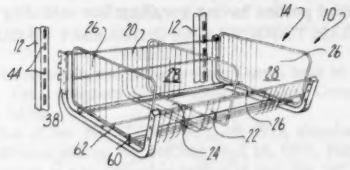
**DISPLAY ASSEMBLY**

**Frederick F. Brunette, Farmington, Mich., assignor to Bobbie Brunette, Grand Haven, Mich., a part interest**

**Filed Mar. 22, 1976, Ser. No. 669,259**

**Int. Cl.[2] A47F 3/14**

**U.S. Cl. 211—126** **10 Claims**



1. A display assembly adapted to be secured to a pair of spaced and parallel upright supports, said assembly comprising:

a basket portion;

an end support bar secured adjacent each lateral end of said basket portion, and

means for removably securing each end of said display assembly to one of said upright supports, said means further comprising a first member having an elongated portion extending normal to said lateral ends which is laterally slidably disposed through one of said end support bars whereby said elongated portion supports said end support bar, and means extending normal to said elongated portion for securing said first member to one of said upright supports whereby the laterally slidable elongated portion compensates for lateral misalignment between the upright supports.

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**4,109,798**

**CRANE HAVING OVERLOAD RELEASE MEANS**

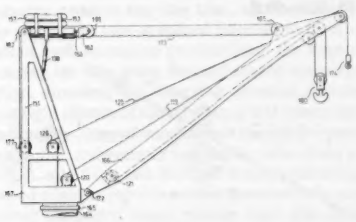
**Cecil Alastair Comyns-Carr, Lansdown, England, assignor to Stothert & Pitt Limited, England**

**Filed Sep. 22, 1977, Ser. No. 835,743**

**Claims priority, application United Kingdom, Sep. 30, 1976, 40621/76**

**Int. Cl.[2] B66C 13/48**

**U.S. Cl. 212—39 R** **6 Claims**



1. In a crane having a superstructure and comprising at least one hoist winch having a barrel on which a hoist cable is stored, said hoist cable being connected to the barrel of the hoist winch by link means which parts at a predetermined tension, a jib over which said cable is reeved for connection to a load, and a derricking system including a derricking winch and pivotally mounted pulley means, a derricking cable winch is reeved over the derricking winch, the pulley means and the jib for luffing the jib, the improvement wherein the derricking system comprises hydraulic ram means and preloaded hydropneumatic accumulator means connected to said hydraulic ram means, said ram means and said accumulator means being mounted on said crane superstructure, said ram means having rod means connected to said pulley means for pivoting said pulley means, the gas pressure in said accumulator means being set to cause said ram means to react against a predetermined overload in said derricking system, and including release means for said hoist winch, said release means being responsive to movement of said ram means due to exceeding said predetermined overload whereby said hoist winch, when released, pays out said hoist cable to enable parting of said link means.

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**4,109,799**

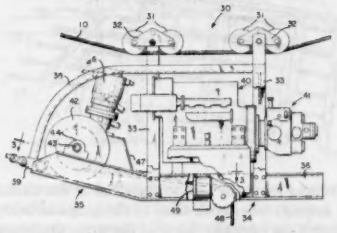
**SKYLINE LOGGING CARRIAGE**

**Leo Arnold Munn, P.O. Box 636, Granite Falls, Wash. 98252**

**Filed Aug. 6, 1975, Ser. No. 602,380**

**Int. Cl.[2] B66C 21/00**

**U.S. Cl. 212—83** **2 Claims**



1. A skyline logging carriage adapted to travel along a suspended skyline cable in a logging operation comprising:

a suspended skyline cable,

a pair of spaced, vertical carriage yoke supports, each having skyline cable rider sheaves rotatably mounted on one end thereof for flexible suspension of the yoke supports from the skyline cable, the cable extending between the skyline rider sheaves,

a carriage frame secured to the other end of the pair of yoke supports, the carriage frame including a first frame portion extending parallel to the portion of the skyline between the skyline cable rider sheaves and a second angled frame portion tilted upwardly toward the skyline cable at an angle of about 15° relative to the first portion,

a fairlead mounted on the first portion of the carriage frame intermediate the skyline cable rider sheaves and in the plane formed by the first frame portion,

a cable-winding drum rotatably mounted on the angled frame portion of the carriage to provide proper level winding around the winding drum and to prevent lifting of the skyline carriage from the skyline cable when a heavy load is being lifted, the axis of the cable-winding drum elevated above the fairlead and laterally offset therefrom,

a load cable extending vertically through the fair-lead and leading onto the cable-winding drum at a materially different angle from the vertical or horizontal,

an internal combustion engine having a power output shaft, the engine mounted on the first frame portion directly above the fairlead and adjacent the cable-winding drum,

a reversible, variable displacement fluid pump providing a source of high-pressure fluid output connected to the output shaft of the engine,

a fluid motor having a worm gear output shaft, the motor driven by the high-pressure fluid output of the variable displacement pump,

a circular gear operatively connected to the cable-winding drum and engaging the worm gear,

means for controlling travel of the skyline carriage along the skyline including a yarder having a cable-winding drum, and a mainline cable secured at one end to the angled frame portion and wound around the cable-winding drum of the yarder at the other end,

control means, including a hydraulic system with radio controlled solenoid valves on the carriage frame, for starting and stopping rotation of the winch drum, either to payout or haul in on the load cable,

a brake system mounted on the carriage frame adjacent the skyline cable adapted to grip the skyline cable, and

remote controlled means for operating the brake system.

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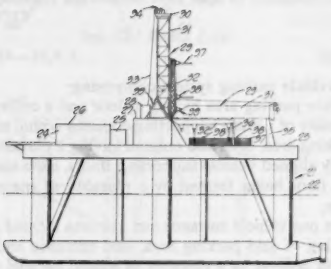
**4,109,800**

## MULTI-STAGE WELL-DRILLING MAST ASSEMBLY

**James A. Howard, and Roger Smith, Jr., both of Houston, Tex., assignors to BJ-Hughes Inc., Long Beach, Calif.**

**Filed Oct. 10, 1973, Ser. No. 404,943**
**Int. Cl.[2] E21B *19/00***
**U.S. Cl. 214—2.5** **20 Claims**



1. A multi-stage, well-drilling mast assembly comprising: a platform; a first stage mast; means pivotally mounting said first stage mast on said platform for swinging movements between horizontal and upright positions; means for locking said first stage mast in upright position; a second stage mast; means pivotally mounting said second stage mast on said platform for swinging movements between an upright position adjacent to said first stage mast in its upright position and a horizontal position; and means for locking said second stage mast in upright position; including means for vertically racking a plurality of stands of well pipe in said mast assembly; and power operated racker means carried by said second stage mast for moving a selected stand of well pipe between a position in said racking means and a position on the center line of said mast assembly.

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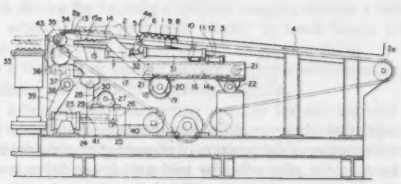
**4,109,801**

## STEEL SHAPE STACKING APPARATUS

**Tsutomu Uchida, Matsudo; Zenichi Ono, Kawaguchi; Makoto Nagashima, Ageo; Eiji Tasaka; Shigeo Mitsui, both of Kawaguchi, and Keiichi Nomura, Urawa, all of Japan, assignors to Toshin Seiko Kabushiki Kaisha, Japan**

**Filed Sep. 8, 1976, Ser. No. 721,585**
**Claims priority, application Japan, Sep. 10, 1975, 50-108873**
**Int. Cl.[2] B65G *57/04***
**U.S. Cl. 214—6 FS** **2 Claims**

1. An apparatus for automatically stacking steel shapes: which comprises, in combination, an endless conveyor driven by driving means for conveying steel shapes transversely placed thereon; an overlapping member disposed above and along said conveyor to form a passage therebetween for permitting steel shapes to pass without being overlapped; a stand-by stop member adapted to project into said passage for stopping said conveyed steel shapes at an intermediate part of said passage and then to retract from said passage for advancing said stopped steel shapes; assorting stop means adapted to project into said passage at a position upstream of said stand-by stop member and then to retract from said passage, timing of the projection and retraction of said assorting stop means being correlated to timing of the projection and retraction of said stand-by stop member so that upon aligned-stop of a group of steel shapes of a predetermined number by projection of said stand-by stop member said assorting stop means is projected to stop the steel shape just succeeding to said group of steel shapes and said stand-by stop member is retracted to advance said group of steel shapes, and upon completion of advancement of said group of steel shapes said assorting stop means is retracted and said stand-by stop member is projected; a take-out stop member for stopping temporarily said advanced group of the steel shapes at a take-out position; stacking lifter means disposed at a position downstream from said conveyor; stacking lever means adapted to lift said group of steel shapes



stopped by said take-out stop member from said conveyor to a level above said stacking lifter, said lever means being adapted to carry out quick retraction and lowering to its original position after lifting of said group of the steel shapes on the stacking lifter means; and driving means for correlating and synchronously driving said stand-by stop member, assorting stop means and said stacking lever means so as to repeat their correlated foregoing operations; said stacking lever means comprising magnetic lever means for stacking said steel shapes of a group in an inverted state on said stacking lifter, said magnetic lever means being used at certain intervals in place of said stacking lever; and said assorting stop means being defined by two switchable stop members adapted to have but one of said members in an actuated state, one of said members corresponding to the number of steel shapes in a group to be stacked by said stacking lever means and the other corresponding to the number of steel shapes in a group to be stacked by said magnetic lever means.

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**4,109,802**

## DEPALLETIZING APPARATUS

**Alan James Fishwick, Bolton, England, assignor to Metal Box Limited, Reading, England**

**Filed Mar. 17, 1977, Ser. No. 778,538**
**Int. Cl.[2] B65G *59/02***
**U.S. Cl. 214—8.5 F** **9 Claims**

1. In apparatus for transferring layers of articles, one layer at a time, from a pile of superimposed layers, of the kind comprising a bottom support for a pile of layers of articles; a transfer head positioned above said bottom support, which transfer head includes a transfer table; and support means for said transfer head including means for lowering and raising said transfer head relative to said bottom support first to align the transfer table with the top layer of the pile and then to align the transfer table with a layer-receiving means; the improvement wherein said transfer head includes:

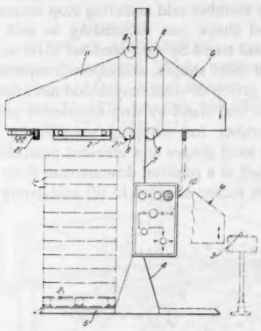
transfer means for engaging the top layer of the pile;

operating means connected to the transfer means for reciprocating said transfer means lengthwise said transfer table to move the top layer of the pile on to the transfer table and to move a layer from said transfer table on to said layer-receiving means;

opposed clamp members arranged for engaging the sides of

a lower layer immediately below the top layer when said transfer means is aligned with the top layer, to clamp said lower layer preparatory to moving the top layer on to the transfer table; and

individual actuating means for each of said clamp members, each operable to move its clamp member inwardly only



until that clamp member engages said next lower layer irrespective of the position of alignment of said next lower layer in the pile, whereby said next lower layer is stabilized in the position in which it is presented in the pile during movement of the top layer on to said transfer table by said transfer means.

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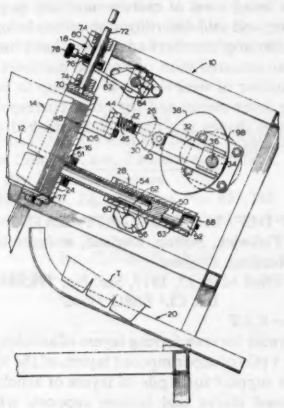
**4,109,803**

**METHOD AND APPARATUS FOR DE-STACKING TRAYS**

**Alan Ralph Quelch, 16 George St., North, Cambridge (Galt), Ontario, Canada (N1S 2M8)**

**Filed Feb. 14, 1977, Ser. No. 768,757**
**Int. Cl.[2] B65G *59/06***
**U.S. Cl. 214—8.5 D** **13 Claims**



1. A method of removing trays individually from a inverted stack of nested trays, comprising the steps of:

releasing the inverted stack to allow it to move and bear against a plate means so that the lowermost tray forms a closed chamber therewith;

clamping the inverted stack, except the lowermost tray, against movement thereof;

applying negative pressure through the plate means to the closed chamber;

withdrawing the plate means from the stack with the lowermost tray adhering thereto by suction;

releasing the negative pressure from the closed chamber whereby the adhering tray is released from the plate means.

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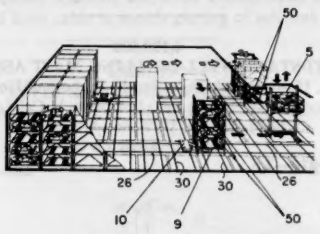
**4,109,804**

**VEHICLE PARKING SYSTEM WITH A PLURALITY OF MOVABLE COLUMS HAVING VEHICLE SUPPORTING FLOORS**

**Rafael Leon Moyano, Obispo Mardone, 78, Cordoba, Spain**

**Filed Jan. 30, 1976, Ser. No. 653,889**
**Claims priority, application Spain, Jan. 30, 1975, 434.295**
**Int. Cl.[2] E04H *6/06***
**U.S. Cl. 214—16.1 CB** **9 Claims**




4. A vehicle parking system comprising:

a vehicle parking area having a floor and a ceiling;

a plurality of vehicle supporting columns within said vehicle parking area, each said column having a plurality of vertically aligned vehicle supporting floors, each said supporting floor being formed by a plurality of spaced parallel slats;

at least one vehicle entrance and exit area located above said ceiling of said parking area, said entrance and exit area being defined by a plurality of spaced parallel slats;

at least one cargo hoist unit supported in a fixed horizontal position on said floor of said parking area, said cargo hoist unit having at least one vertically movable elevator means, selectively alignable with said entrance and exit area and said floors of said columns, for vertically moving vehicles between said entrance and exit area and selected column floor levels;

transfer carriage means, mounted on said cargo hoist unit elevator means, for transferring a vehicle between said entrance and exit area and said cargo hoist unit and between said cargo hoist unit and a selected floor of a column positioned adjacent said cargo hoist unit, said transfer carriage comprising a frame, a plurality of spaced parallel bars supported by said frame, means for moving said bars horizontally between said cargo hoist unit and said entrance and exit area or a selected column floor, said bars being dimensioned to fit between said spaced slats of said entrance and exit area or said selected column floor, and means for moving said bars vertically between said spaced slats to pick up a vehicle from or deposit a vehicle on said entrance and exit area or said selected column floor; and

means, positioned within said parking area, for horizontally moving selected of said columns between a position confronting said cargo hoist unit and selected storage positions within said parking area, said column moving means comprising a first plurality of parallel tracks extending in a first direction on said parking area floor, a lower platform movable along said first tracks, a second plurality of tracks extending in directions transverse to said first tracks, said second tracks comprising first track portions on said parking area floor and second track portions on the top of said lower platform and alignable with said first track portions, an upper platform movable along said second tracks between a position above and supported on said lower platform and a position beneath a selected said column, and means on said upper platform for vertically lifting and supporting said selected column when said

upper platform is positioned thereunder, whereby when said upper platform then moves to a position above said lower platform, said selected column and said upper platform are supported by said lower platform, said column lifting means comprising vertically movable jacks, and concave elements on said column to receive said jacks.

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4,109,805

## DEVICE FOR INSERTING AND/OR WITHDRAWING PARTICULARLY LONG AND/OR HEAVY MATERIAL IN A STORAGE CONTAINER

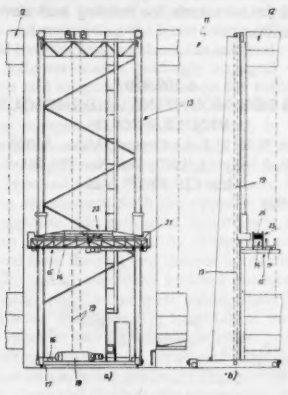
Hans Wagner, Esslingen, Fed. Rep. of Germany, assignor to Hans Fehr GmbH, Fed. Rep. of Germany

Filed Dec. 7, 1976, Ser. No. 748,163

Claims priority, application Fed. Rep. of Germany, Dec. 11, 1975, 2555712

Int. Cl.² B65G *1/06*

U.S. Cl. 214—16.4 A 26 Claims



1. In a device for inserting and/or withdrawing particularly long and/or heavy material in and/or from a storage container having several horizontal and vertical shelves, the improvement wherein said device includes an elevating table; a column means, said elevating table being vertically movably attached to said column means; at least one gripper support means mounted on said elevating table; an endless chain mounted for circulating movement on said gripper support means, said endless chain having two parallel and horizontal runs; a gripper means mounted on said endless chain for horizontal movement to-and-fro along the gripper support means, said gripper means including at least two gripper arms whose relative movement for picking up and releasing the material in said storage container is derived solely from the movement of said endless chain, said gripper means also including a link means connecting said gripper arms to said endless chain, said link means causing said gripper arms to move together when said endless chain causes said gripper means to move along a horizontal run thereof and then move apart and finally downwardly relative to said gripper means and thus away from said material when the horizontal movement of said gripper means is temporarily stopped and when the mounting point between said gripper means and said endless chain circulates from one of the horizontal runs of said endless chain to the other.

4,109,806

## DEVICE FOR MOVING RAILWAY WAGGONS

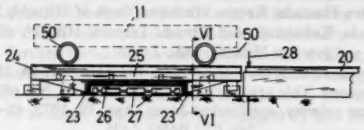
Anders Johansson, Bohus Björkö, and Per Strömbeck, Lindome, both of Sweden, assignors to Salen & Wicander Terminalsystem AB, Gothenburg, Sweden

Filed Feb. 25, 1977, Ser. No. 772,244

Claims priority, application Sweden, Feb. 27, 1976, 7602613

Int. Cl.² B60P *1/16;* B65G *67/02*

U.S. Cl. 214—38 CC 5 Claims




1. A device for moving a railway waggon outside a railway yard where tracks terminate blindly at track heads which define a pocket and include a fixed stop, comprising

(a) a framework carrier having a length corresponding to about the length of a railway waggon,

(b) a detachable transporting member for moving said carrier along the ground, outside the yard, said transporting member having a superstructure which engages said transverse beams, supporting wheel means, and means for raising and lowering said superstructure with respect to said wheel means,

(c) said carrier including a pair of transverse beams adapted for co-operation with said transporting member, a pair of longitudinal beams carried on said transverse beams and spaced apart at normal track gauge, and a length of rail on each said longitudinal beam,

(d) said transverse beams having projecting portions adapted, when brought into contact with the fixed stop at the track head, to position said lengths of rails into alignment with rails at a track.

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4,109,807

## SUPPORT FOR LOADER LIFT ARM

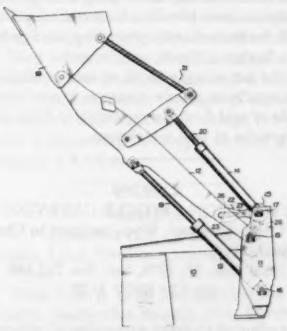
Yasuhiko Yoshida, Teraimachi, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Nov. 5, 1976, Ser. No. 739,350

Claims priority, application Japan, Nov. 6, 1975, 50-150214[U]

Int. Cl.² E02F *3/36*

U.S. Cl. 214—131 R 3 Claims



1. A support for lift arms of a tractor mounted loader comprising a tractor frame, lift arms for supporting a loader bucket, said lift arms being pivotally mounted on said tractor frame, a pin embedded in said lift arm, a link pivotally mounted on said tractor frame at a point above the pivotal mount of said lift arm

on said tractor frame, said link having an elongated first hole to facilitate engagement with said pin when said lift arms are raised and a relatively small second hole formed therein, and means provided on said frame for selectively engageable with said second hole for the accomodation of said link when said lift arms are lowered.

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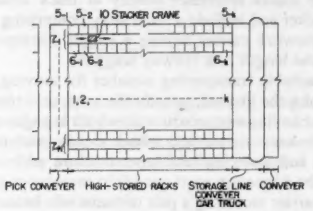
**4,109,808**

## METHOD OF STORING ARTICLES IN A WAREHOUSE TO FORM AN IMAGINARY LINK OF ARTICLES

**Nobuhiro Hamada; Kotaro Hirasawa, both of Hitachi; Minoru Hatada, Kokubunji, and Hiroshi Tamura, Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan**

**Continuation-in-part of Ser. No. 461,431, Apr. 16, 1974, abandoned. This application Jun. 8, 1976, Ser. No. 693,980**
**Claims priority, application Japan, Apr. 18, 1973, 48-43127**
**Int. Cl.[2] B65G *1/06***
**U.S. Cl. 214—152** **8 Claims**




1. A method of storing articles in a warehouse that comprises a plurality of storage blocks arranged adjacent each other, each of the storing blocks having a plurality of spaced racks for storing articles, linearly extending aisles between said racks, article transfer means arranged for movement in respective aisles to transfer articles relative to a given location within a respective storage block, control means for operating said article transfer means in accordance with a predetermined mode to transfer articles relative to said storage blocks, comprising the steps of:

storing a plurality of different articles in said storage blocks with at least two different articles in each storage block;

storing in a first storage block at least one and another different articles;

storing in a second storage block at least one article common to the one different article in said first storage block and at least one additional different article;

storing in a third and any succeeding storage block at least one article common to said at least one additional different article of the immediately preceding storage block and at least one further different article; and

storing in the last storage block as said at least one further different article an article common to said another different article of said first storage block to form an imaginary loop of articles in said warehouse.

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**4,109,809**

## MULTIPLE POSITION VEHICLE CARRYING TRAILER

**Bobby Dean Clark, Shoshoni, Wyo., assignor to Chair-E-Yacht, Inc., Shoshoni, Wyo.**

**Filed Dec. 23, 1976, Ser. No. 753,668**
**Int. Cl.[2] B60P *1/28***
**U.S. Cl. 214—505** **8 Claims**

1. A trailer adapted to carry a plurality of vehicles, comprising:

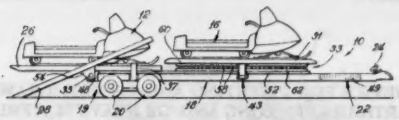
a frame means;

a plurality of wheels rotatably mounted on said frame means to support it rollably above the ground;

a pair of vehicle supporting trailer beds normally disposed in a use position in side-by-side relationship in a common horizontal plane on said frame means for each supporting individually from below one of said vehicles;

pivoting means disposed at the rear edge of said frame means for mounting individually and tiltably said beds on said frame means forwardly of the mid-point of said beds to enable them to tilt individually and independently backwardly until their rear edges contact the ground and to enable the loaded beds to tilt back to their horizontal use position under the weight of the vehicles;

latching means for holding said beds releasably in their use positions;



a turntable:

means for mounting said turntable on said frame means forwardly of said beds to enable said turntable to rotate about a centrally-disposed vertical axis independently of said beds;

means on said turntable supporting at least another one of said vehicles to enable it to be driven from said turntable onto one of said beds; and

latching and detent means for holding said turntable in a given position.

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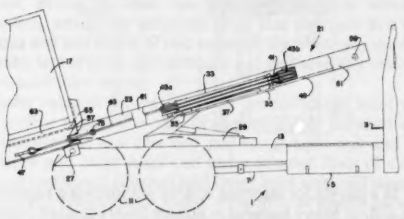
**4,109,810**

## APPARATUS FOR MOUNTING AND DEMOUNTING A VEHICLE BODY

**Eldon D. Jones, R.R. 2, Lake Crystal, Minn. 56055**

**Filed May 11, 1977, Ser. No. 795,981**
**Int. Cl.[2] B60P *1/28***
**U.S. Cl. 214—505** **29 Claims**



1. An apparatus for mounting or demounting a vehicle body onto or from a vehicle chassis comprising a platform for supporting said body, means for pivotally connecting said platform to the vehicle chassis, means for rotating said platform about said pivotal connection means, a winch means for controllable moving a vehicle body off of or onto said platform and means for securing the said body to the platform,

said winch means comprising a hydraulic cylinder winch having an extendable cylinder shaft and having at either end a set of multiwrap sheaves, and a cable multiwrapped about said sheaves, one end of said cable being secured and the other end being secured and attached to means for removably securing it to the body and wherein said platform comprises a pair of longitudinal beams in spaced relationship, each of said beams being provided along its side with a support means having located therein in substantially parallel and proximal relationship with its respective beam a said hydraulic cylinder winch thereby defining a relatively small longitudinal cavity extending between said beam, support and winch, one of the sets of sheaves being stationary and the other set of said sheaves being connected to the extendable cylinder shaft, each of

said cylinder winches having its own cable, a substantial portion of the last length of the cable being located within said cavity thereby to act as a protective shield in the event of cable breakage.

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**4,109,811**

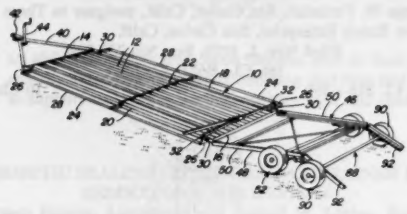
## TRAILER WITH LOWERABLE BED

**James L. Stucky, P.O. Box 673, Moundridge, Kans. 67107**

**Filed Mar. 1, 1977, Ser. No. 773,152**

**Int. Cl.[2] B62D *21/14***

**U.S. Cl. 214—506** **4 Claims**



1. A farm implement carrier comprising an elongated load bed having front and rear ends, the front end of said load bed including means for hitching to a draft vehicle, a rear frame section including a pair of opposite side elongated longitudinal members, wheeled transverse axle means supported beneath said frame and supporting the latter intermediate the opposite ends of said longitudinal members, the rear end of said load bed including follower means guidingly engaged with and supported from said longitudinal members for shifting therealong from the front ends thereof, when the latter are inclined downwardly for engagement with the ground, to the rear ends thereof behind said axle means and the fulcrum defined thereby, whereby to over-balance the rear ends of said longitudinal members and cause the front ends thereof to swing upwardly into engagement with the opposite sides of said load bed, said opposite side elongated longitudinal members each including an elongated rearwardly projecting extension pivotally mounted from the rear end thereof for oscillation between a rearwardly and downwardly inclined position and a generally horizontal position at least substantially longitudinally aligned with the corresponding longitudinal member, a transverse axle member having wheels jounaled from its opposite ends extending between and supported from said extensions, said follower means being guidingly engageable with, shiftable rearwardly along and displaceable rearwardly off the rear ends of said extensions.

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**4,109,812**

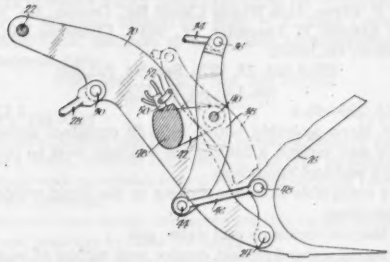
## DUMP CONTROL FOR LOADERS

**Stanley B. Adams, Yorkville, and Michael P. Morge, Oswego, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Mar. 25, 1977, Ser. No. 781,265**

**Int. Cl.[2] E02F *3/84***

**U.S. Cl. 214—762** **4 Claims**



1. A vehicle having a frame, a load lifter, a pair of arms each having one end pivoted to the frame and the other end pivoted to the load lifter, at least one tilt cylinder carried by the arms and having an extendable rod, a first link pivoted intermediate its ends to an arm and at its ends to said rod and to a second link, said second link being pivoted to said load lifter, a hydraulic system including a manual actuator for controlling the cylinder to pivot the load lifter between forward and rearward positions on the arms, means for sensing the position of said load lifter and for halting the flow of hydraulic fluid to and from said cylinder when said load lifter is moving forwardly on said arms just short of said forward position to trap hydraulic fluid within said cylinder to act as a hydraulic cushion halting further forward movement of said load lifter, and a cross member extending between said arms, said sensing means comprises a sensing valve mounted on said cross member and having an actuator positioned to be engaged by said first link.

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**4,109,813**

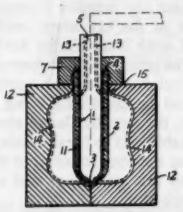
## COMPOSITE PLASTIC CONTAINER

**Emery I. Valyi, 5200 Sycamore Ave., New York, N.Y. 10471**

**Continuation of Ser. No. 343,498, Mar. 21, 1973, abandoned, which is a division of Ser. No. 186,984, Oct. 6, 1971, Pat. No. 3,787,157, which is a continuation-in-part of Ser. No. 71,734, Jul. 14, 1970, Pat. No. 3,717,544, and Ser. No. 100,050, Dec. 21, 1970, Pat. No. 3,719,735. This application Jul. 2, 1975, Ser. No. 592,551**

**Int. Cl.[2] B65D *25/34, 47/10***

**U.S. Cl. 215—1 C** **8 Claims**



1. A blown, seamless multilayered, hollow plastic container defining a dispensing container having bottom portion and an opposed dispensing mouth portion, said container having a bottom portion comprising at least a rim and wall portions integral therewith comprising side walls extending from said rim and terminating in an end wall opposite said rim defining a dispensing mouth, said container having an inner thermoplastic layer, and an outer seamless pressure molded layer, the two layers being adhered one to the other substantially throughout their contacting surfaces, wherein the end wall portion of one of said layers has a discontinuity, said discontinuity being completely filled by the material of the other of said layers which completely covers said mouth, and wherein the inner and outer layers are continuous throughout the extent thereof and are co-extensive with each other except for said discontinuity, whereby a dispensing opening is formed when said end wall discontinuity is broken.

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**4,109,814**

## CONTAINER CLOSURE

**Hans A. Rausing, Lund, Sweden, assignor to AB Ziristor, Lund, Sweden**

**Filed Nov. 8, 1976, Ser. No. 739,788**

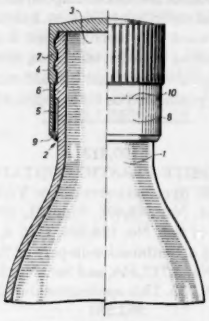
**Claims priority, application Sweden, Nov. 19, 1975, 7512983**

**Int. Cl.[2] B65D *55/02***

**U.S. Cl. 215—217** **3 Claims**

1. A closure for a container having a neck portion provided with a pouring opening and with outer screw threads about and an annular outwardly projecting bulge at the lower end of the screw threads, said closure comprising a cap member having an upper internally threaded portion for engagement

with the screw threads of the neck portion of the container and a cylindrical sealing portion therebelow, the inner diameter of the cylindrical sealing portion being not less than the outer diameter of the annular bulge of the neck portion of the container and further having an inwardly directed annular flange at the lower end of the cylindrical portion, the inner diameter of the flange being less than the outer diameter of the annular bulge of the neck portion of the container, the length of the upper threaded portion of said cap member being greater than the length of the cylindrical sealing portion between the annular flange and the annular bulge of the neck portion of the



container when said cap member is completely screwed onto the neck portion of the container, said cap member being further provided with a breakable kerf extending a major distance around the circumference thereof and disposed opposite the annular bulge of the neck portion of the container, whereby when said cap member is being unscrewed for opening the container, the annular flange abuts the annular bulge causing the breakable kerf to break leaving the upper threaded portion of said cap member attached to the cylindrical sealing portion thereof by that portion of said cap member between the two ends of the kerf.

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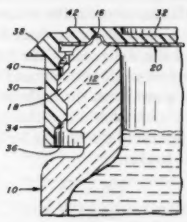
**4,109,815**

## INDUCTION HEAT SEALED CONTAINERS

**John W. Collins, III, Allegheny Township, Westmoreland County, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.**

**Filed Dec. 8, 1976, Ser. No. 748,694**
**Int. Cl.[2] B65D *41/18***
**U.S. Cl. 215—232** **5 Claims**



1. A sealed container comprising a glass jar having a mouth with an upwardly facing surface and a raised bead thereon continuous around said mouth and having an upwardly convex narrow cross-sectional configuration, said bead having a height approximating the commercially acceptable dimensional tolerance for said upwardly facing surface on said container mouth, a metal foil membrane spanning said container mouth heat sealed to said bead and a plastic snap cap over said container mouth and foil membrane, said snap cap being made of heat and pressure-deformable plastic having a thickness over said upwardly facing surface on the container of at least twice the height of said bead, and with said bead providing a unit force against said membrane and cap sufficient to permit the generation of permanent plastic flow in the cap at induction heat temperatures below the melting point of said heat and pressure-deformable plastic, and with said foil membrane and said plastic snap cap at least partially conforming to the cross-sectional contour of said bead.

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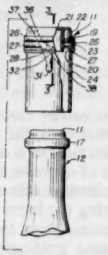
**4,109,816**

## PLASTIC CAP FOR BOTTLE

**George W. Faulstich, San Carlos, Calif., assignor to Three Sisters Ranch Enterprise, San Carlos, Calif.**

**Filed Nov. 1, 1976, Ser. No. 737,384**
**Int. Cl.[2] B65D *41/32***
**U.S. Cl. 215—256** **10 Claims**



1. In combination a wine bottle having a neck formed with an annular finish at the upper end of said neck, the outside of said neck shaped with a short, cylindrical outside upper surface below said finish, a first bead below said upper surface and an elongated cylindrical outside lower surface below said first bead, said upper and lower surfaces being of about the same diameter, said neck being formed with a cylindrical inner surface below said finish and a thin-walled, flexible plastic cap for closing said bottle, said cap being deformable to stretch over said bead, said cap comprising a top disk having a diameter about equal to said finish, a thin-walled outer skirt depending from said disk, said outer skirt having a top portion shaped to fit tightly around said upper surface, a pair of internal beads shaped to fit tightly around the edges of said first bead, a bottom portion shaped to fit around at least a portion of said lower surface and a pull tab depending below said pair of internal beads, vertically spaced apart under and lower score lines being located between said pair of internal beads which weaken said outer skirt when said tab is pulled so that a circumferential band may be torn off between said score lines, permitting removal of the portion of said cap above said upper score line.

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**4,109,817**

## STRAW ASSEMBLY FOR A LIQUID CONTAINER

**Larry E. Payne, 3224 Wesley Chapel Rd., Decatur, Ga. 30034, and Kenneth D. Lancaster, Jr., 965-C Clubhouse Cir., W., Decatur, Ga. 30032**

**Filed Sep. 23, 1976, Ser. No. 725,880**
**Int. Cl.[2] A47G *19/22***
**U.S. Cl. 220—90.2** **2 Claims**

1. A straw assembly within a liquid container having an interior wall surface, a flat top and a closure over an opening through said top, comprising

(a) a collapsible straw for sucking up the liquid within said container;

(b) buoyant means on said straw; and

(c) means secured on said interior wall surface of said container for retaining said straw within said container in alignment with said opening, said retaining means com-

prising a ring, means for supporting said ring above the bottom of said container, a hollow post concentrically disposed through said ring and being of sufficient diameter

to slidably receive said straw therein and at least two radially extending ribs interconnecting said ring and post to support said post in vertical registry with said opening.

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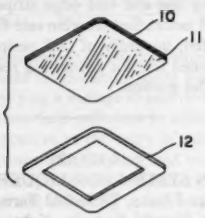
**4,109,818**

## HERMETIC SEALING COVER FOR A CONTAINER FOR SEMICONDUCTOR DEVICES

**Norman Hascoe, Larchmont, and Samuel W. Levine, Roslyn, both of N.Y., assignors to Semi-Alloys, Inc., Mount Vernon, N.Y.**

**Filed Jun. 3, 1975, Ser. No. 583,463**
**Int. Cl.[2] B65D *39/00***
**U.S. Cl. 220—200** **3 Claims**




1. A prefabricated hermetic sealing-cover unit for a heat-sealable container having a semiconductor device therein comprising:

a cover element having upper and lower surfaces and being of a material impervious to moisture and air;

a thin coating of substantially chemically unreacted thermosetting plastic matter adhered to the lower surface of said cover element without heat;

and a preformed sealing ring of substantially chemically unreacted thermosetting plastic material adhered to the coated surface of, and in registry with periphery of, said cover element without heat, said prefabricated hermetic sealing-cover unit being responsive to heat to fuse the sealing ring and coating to the cover element.

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**4,109,819**

## EXPLOSION VENT AND METHOD OF VENTING

**Robert L. Kushman, Mason, and Sumy H. C. Ling, Cincinnati, both of Ohio, assignors to The Stacey Manufacturing Co., Cincinnati, Ohio**

**Filed May 16, 1977, Ser. No. 797,352**
**Int. Cl.[2] B65D *51/16***
**U.S. Cl. 220—208** **12 Claims**

1. In an explosion vent for rapidly releasing pressure buildup within a vessel, wherein the vent is of the type including,

a framework mountable to said vessel and defining a series of vent openings,

a series of vent covers releasably seatable on the respective vent openings to close the same,

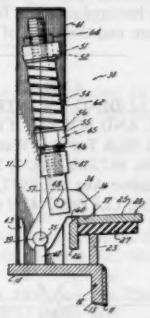
each vent cover being associated with a series of quick-release clamp mechanisms engaging it around its periphery for releasably holding the cover in place on the respective vent opening,

the improvement in the clamp mechanism comprising,

a latch member connected at one end thereof to said framework by a pivot, said latch member presenting at an opposite end thereof a bearing surface engageable on an edge portion of the respective cover to apply a vent closing force thereon,

said latch member being swingable about said pivot between a closed position, in which said bearing surface bears upon said cover to press the same toward said framework, and an open position in which said latch member is clear of said cover,

a shaft swingably connected at a first point to said latch member between said pivot and said bearing surface, said shaft movably attached at a second point to a support on said framework, the shaft being so mounted that when said latch member is in said closed position said shaft lies on one side of an imaginary line between said pivot and said



second point, and on an opposite side of said imaginary line when said latch member is in said open position,

a spring in compression on said shaft and biasing said latch member away from said second point,

the cover being connected to said framework for lineal movement away from the opening,

said spring exerting a biasing force that changes as said cover is lifted from said vent opening by gas pressure in the vessel, said spring yielding in response to gas pressure below said cover, up to a predetermined pressure, without releasing any of the clamp mechanisms, whereby said cover lifts lineally from said vent opening, such lineal movement establishing an annular gap between said cover and vent opening through which gas pressure can vent uniformly around said periphery, said clamp mechanisms remaining engaged with said cover for reseating the cover if said pressure drops,

said spring yielding further to a pressure rise above said predetermined pressure and said latching member moving clear of said cover, to release the same.

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**4,109,820**

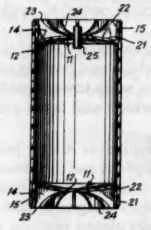
## SELF-THREADING CONTAINER CLOSURE AND METHOD THEREOF

**Joseph Michael Stifano, Middleton, N.Y., assignor to International Paper Company, New York, N.Y.**

**Filed Jun. 9, 1977, Ser. No. 805,071**
**Int. Cl.[2] B65B *1/04*; B65D *41/04, 41/10***
**U.S. Cl. 220—240** **9 Claims**

1. A container closure comprising a concave spherical face; an inverted annular flange depending therefrom, the outer surface of said flange being threaded; and a plurality of radial support members underlying said flange and a major portion of

said face, said major portion excluding the central area of said face, said radial support members including horizontal feet portions extending inwardly from the base of said flange to the interior of said closure, and said radial support members and the unsupported central portion of the concave face defining



an arch of lesser diameter than that of the concave spherical face, said arch being of a size and shape sufficient to transform a major portion of forces vertical to the concave face into force components more horizontal to said face to strengthen the seal between the closure and the walls of the container.

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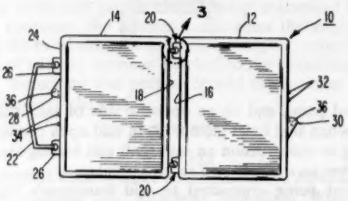
**4,109,821**

## ARTICLE INCLUDING AN INTEGRALLY MOLDED BALL AND SOCKET TYPE HINGE

**Michael Lutz, 226 High Tor Dr., Watchung, N.J. 07060**

**Division of Ser. No. 647,088, Jan. 7, 1976, Pat. No. 4,049,231.**
**This application Aug. 15, 1977, Ser. No. 824,627**
**Int. Cl.² B65D *43/14, 51/04***
**U.S. Cl. 220—337** **18 Claims**



1. An article including two sections articulated to one another by at least one hinge that includes a substantially spherical male hinge member disposed within a recess of a female hinge member and retaining means for confining the male hinge member within the recess of the female hinge member, the improvement wherein said retaining means of said at least one hinge member forms molded junctions with adjacent surfaces of the male hinge member and the recess of the female hinge member, said retaining means being fracturable at or adjacent the molded junction of the male hinge members to confine the male hinge member for rotational motion within said recess.

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**4,109,822**

## PACKAGE COMPOSED OF AN INNER BAG ENCLOSED BY AN OUTER CONTAINER

**Alwin Egli, Beringen, Switzerland, assignor to SIG Schweizerische Industrie-Gesellschaft, Neuhausen am Rheinfall, Switzerland**

**Filed Sep. 15, 1976, Ser. No. 723,491**
**Claims priority, application Switzerland, Sep. 23, 1975, 12348/75**
**Int. Cl.² B65D *5/60***
**U.S. Cl. 220—404** **4 Claims**

1. A package arranged to be opened at its top and comprising: an inner bag having a flat top which is sealed, said inner bag being made of a sealable, flexible foil; an outer container of rectangular cross section enclosing said inner bag, said container including a jacket of stiff sheet material having an open end corresponding to the top of said package, and protruding beyond said flat top of said inner bag, and a lid insert of stiff sheet material positioned in such open end, said insert having a flat portion which bears against said flat top of said inner bag, said flat portion of said insert being coextensive with said flat top of said inner bag in order to completely cover said flat top, and edge strips located at the edges of said flat portion and

extending away from said flat top of said inner bag at an angle to said flat central portion and bearing against the inner surfaces of the open end of said jacket; and adhesive means securing a peripheral region of said flat portion of said lid to said flat top of said inner bag and said edge strips to said protruding open end of said jacket, and wherein said flat portion of said lid insert is provided, inwardly of said peripheral zone, with at least one weakened line for permitting removal of an interior region of said flat portion.

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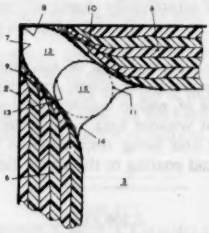
**4,109,823**

## INSULATION SYSTEM FOR LIQUEFIED GAS TANKS

**Roger Cambridge Ffooks, Tittlesfold Farm, near Billingshurst, England, and Hiroshi Komada, Kobe, Japan, assignors to Conch LNG, Moorestown, N.J.**

**Filed Nov. 11, 1976, Ser. No. 740,818**
**Claims priority, application United Kingdom, Nov. 22, 1975, 48119/75**
**Int. Cl.² B65D *87/24, 87/34***
**U.S. Cl. 220—446** **6 Claims**



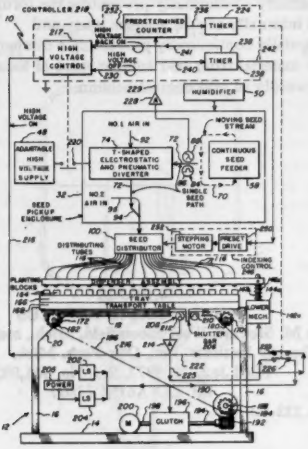
1. A thermally-insulated container of the type comprising (1) an outer prismatic rigid shell having (2) at least one layer of foam plastic thermal insulation material (a) sprayed in situ onto the vertical inside wall surfaces of said shell, (b) at least one of said at least one layers of foam plastic insulation material extending vertically upward to a level which defines the top edges of said container, and (3) flexible reinforcing sheet material (a) rigidly adhered to the side wall surface areas of said foam plastic insulation material, portions of said flexible reinforcing sheet material (b) projecting beyond said top edges, and (c) rigidly affixed directly to said rigid shell above said top edges.

**4,109,824**

## PRECISION SEEDER AND METHOD

Noel Bryant Davis, Wayzata, Minn., assignor to General Mills, Inc., Minneapolis, Minn.

Filed Sep. 1, 1976, Ser. No. 719,625
Int. Cl.[2] B65B *57/20*
U.S. Cl. 221—7 34 Claims




2. Seeding apparatus comprising means providing a supply of moving seeds, means for diverting seeds from said moving supply, means for applying a voltage to said diverting means to develop an electrostatic field sufficient to effect the diversion of a seed, means responsive to the entry of said diverted seed into said diverting means for removing said voltage from said diverting means, a plurality of seed dispensers, and means for receiving seeds from said diverting means and delivering the diverted seeds to said dispensers.

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**4,109,825**

## ROTATABLE COMPARTMENTALIZED VENDING APPARATUS

Barry Sheldon Weitzman, 23875 Park Del Monte, Calabasas Park, Calif. 91302

Filed Dec. 8, 1976, Ser. No. 748,408
Int. Cl.[2] G07F *11/54*
U.S. Cl. 221—14 9 Claims

1. A compartmental vending machine apparatus comprising:

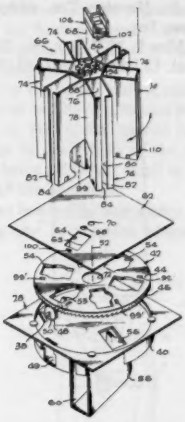
(a) a compartmental member, said compartmental member comprising at least one item holding compartment having at least one open end;

(b) a carrying plate, said carrying plate having at least one opening for receiving an item to be dispensed, said opening being relatively movable with respect to said compartmental member from a first position not in alignment with said at least one opening in said item holding compartment to a second position in alignment with said at least one opening in said item holding compartment;

(c) a separation plate separating said compartment member from said carrying plate, said separation plate having an opening therein at least the size of the item to be dispensed, said separation plate opening being alignable with said openings in said carrying plate and said item holding compartment;

(d) a dispensing chute opening, said dispensing chute opening being alignable with said carrying plate opening;

(e) said carrying plate being movable relative said dispensing opening responsive to a first activation means external to



the vending machine for dispensing an item received by said carrying plate opening into said dispensing opening.

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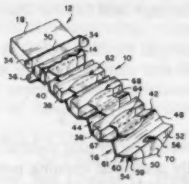
**4,109,826**

## CONTAINER AND DISPENSING PACKAGE

Leo V. Maisonneuve, 4480 N. 40th St., St. Petersburg, Fla. 33714

Filed Oct. 8, 1976, Ser. No. 730,846
Int. Cl.[2] B65D *5/38*
U.S. Cl. 221—72 6 Claims

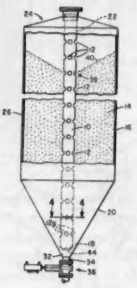


3. A container and dispensing package for storing and dispensing contents therefrom comprising an outer carton having an opening therein and an expandable tray for holding the contents of the package removably disposed within said outer carton, said expandable tray comprising a plurality of adjacent compartments each comprising a forward and a rear partition each movable between a first and second position, said forward and rear partitions disposed to engage the contents when in said first position and to disengage the contents when in said second position, a floor extending between said forward and rear partitions upon which the contents are placed, and means for at least partially removing said expandable tray from said outer carton, each said compartment further comprises a retainer means formed thereon to retain the contents secure therein as each said corresponding compartment of said expandable tray is removed from said outer carton, said retainer means comprises a guard flap disposed between the top of the contents and the top of said package to prevent the contents from engaging the top of said package and a spring member extending from said expandable tray, said spring member being attached to said guard flap to maintain said guard flap between the top of the contents and the top of said package.

## 4,109,827
## METHOD OF DISCHARGING PARTICULATE MATERIAL FROM A HOPPER

James H. Leonard, Jr., Houston, Tex., assignor to Allied Industries Inc., Houston, Tex.

Filed May 9, 1977, Ser. No. 795,122
Int. Cl.[2] B65G *3/12, 65/70*
U.S. Cl. 222—1 2 Claims



1. A method of discharging particulate material from a hopper while minimizing vibration of the hopper and impact loading imparted thereto by said particulate material, said method comprising the steps of:

positioning a generally annular mass of particulate material within the hopper, surrounding a generally centrally located discharge column;

providing a series of vertically spaced discharge openings in said discharge column, with said series extending generally vertically and centrally of said annular mass of particulate material;

discharging said particulate material from said generally annular mass through said openings of said discharge column into a central interior portion of said column and downwardly through said central discharge column to a material outlet;

supporting said central discharge column with said hopper, with its lower end resting directly on a downwardly converging, generally conical hopper base and with its upper end telescopingly received by an upper hopper portion;

providing said lower end of said central discharge column with a generally scalloped opening pattern in a cooperative relation to said base to provide a discharge path for residual particulate material passing downwardly around the lower end of said central discharge column;

restricting the flow of particulate material from said material outlet to an extent sufficient to prevent a gravity induced rate of flow of particulate material outwardly therefrom but to permit a choked flow of particulate material outwardly therefrom;

maintaining a single, downwardly and centrally converging, generally conical portion at the top of said generally annular mass of particulate material, extending between said central dischage column and said hopper;

substantially preventing a discharge of particulate material from said annular mass into openings of said central discharge column below a level generally contiguous with an intersection of said generally conical portion with said central discharge column;

substantially continuously preventing a reduction in density of said annular mass of particulate material below said generally conical portion and within said annular mass;

substantially continuously preventing vibration of said hopper and impact loading of said annular mass on said hopper during said discharging by substantially preventing concurrent discharging, into said interior portion of said central discharge column, of particulate material from materially different levels of said annular mass and from the interior thereof;

substantially continuously emptying said hopper sequentially from the top thereof, progressively downwardly, while substantially continuously blocking discharging of particulate material from hopper portions below said generally conical portion;

substantially continuously preventing the formation of cavities internally of said annular mass; and

substantially continuously preventing a discharge of particulate material from said annular mass at locations radially outwardly of said central column.

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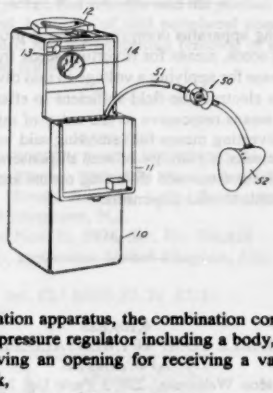
## 4,109,828
## INHALATION APPARATUS

Maurice M. Stewart, West Bloomfield, Mich., assignor to Oxygen Therapy Institute, Inc., Oak Park, Mich.

Filed Jan. 24, 1977, Ser. No. 761,802
Int. Cl.[2] A61M *15/00*
U.S. Cl. 222—3 11 Claims



1. In an inhalation apparatus, the combination comprising

an automatic pressure regulator including a body,

said body having an opening for receiving a valve of an oxygen tank,

said body having an outlet,

said body including walls defining two chambers,

a connecting passage extending from one chamber to the other,

an inlet passage extending to one said chamber,

each said chamber having a diaphragm closing one wall thereof,

spring means yieldingly urging said diaphragm in one direction,

an orifice associated with said inlet,

an orifice associated with said passage,

an orifice member for each said orifice,

a lever for each said chamber,

means for pivoting one end of each said lever to its respective diaphragm,

the other end of each said lever engaging its respective orifice member,

a pressure relief valve in the wall of said body defining said first chamber and operable independently of said lever in said first chamber and its respective orifice member to vent the oxygen from said first chamber directly to the atmosphere when the pressure in said first chamber exceeds a predetermined value.

## 4,109,829

## CONTAINER FOR METERED DISPENSING OF LIQUID

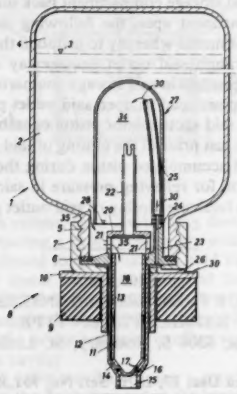
**Alexander Kuckens, Hamburg, and Horst Kohl, Reinfeld, both of Fed. Rep. of Germany, assignors to DAGMA Deutsche Automaten- und Getränkemaschinen- Gesellschaft mit beschrankter Haftung & Co., Reinfeld, Fed. Rep. of Germany**

**Filed Sep. 24, 1976, Ser. No. 726,455**

**Claims priority, application Fed. Rep. of Germany, Oct. 6, 1975, 2544671**

**Int. Cl.² B67B 7/24**

**U.S. Cl. 222—81** **8 Claims**



8. A container for metered dispensing of liquids, in particular for freezable or self-preserving liquids, including a withdrawal and venting opening which in operation is directed downwards in a dispensing position, an inverted cup-shaped pressure compensating vessel which has its rim situated close to the withdrawal and venting aperture and is open only towards this aperture incorporated within the container, the vessel simultaneously forming the closure of the container and having its rim sealingly connected to the rim of the withdrawal and venting aperture of the container, the interior of the pressure compensating vessel being in constant unobstructed communication with an atmosphere external of the container as well as being in communication with the material inside of the container, said pressure compensating vessel having at least one wall portion which is deformable under differential pressure, a withdrawal valve including a metering chamber connected to the inside of the container and to the pressure compensating vessel via an upwardly extending passage, which withdrawal valve is electromagnetically actuated and equipped with a movable valve element constructed as an armature, characterized in that the valve element conjointly with a sleeve guiding it delimits the metering chamber and that the guiding sleeve is constructed with individual openings for the liquid which is to be metered opening into the inside of the container at its upper extremity, and that the valve sleeve is constructed as a valve slider for alternating uncovering or covering the entry openings.

## 4,109,830

## TILTABLE TRAP CHAMBER WITH STACK AIDING FEATURE

**James Richard Zeigler, 245 W. 107th St., New York, N.Y. 10025, and Daniel S. Sauter, 19 Fairview Ave., Montvale, N.J. 07645**

**Filed Apr. 6, 1977, Ser. No. 785,198**

**Int. Cl.² G01F 11/28**

**U.S. Cl. 222—143** **1 Claim**

1. A measuring dispenser comprising,

a container, and

a top for said container,

said top comprising a cover for the mouth of said container and having a threaded flange for securing the top to the container,

a measuring and dispensing means on said top comprising an upper wall and side walls and together with the cover of said container top forming a generally rectangular shaped receptacle having a closed end with one end thereof open to form a discharge port,

at least a portion of the upper wall of said measuring means being transparent and having measuring indicia thereon,

a charging port in said cover spaced inwardly, from the peripheral edge of the mouth of the container and said charging port being relatively small in relation to the size of the mouth of the container,

said charging port being disposed within that portion of the cover forming the rectangular shaped measuring and

dispensing receptacle and being spaced from the closed end of said receptacle to form a measuring volume of said receptacle between the closed end and the charging port,

supporting members on said top extending outwardly from the receptacle, across the cover and being of the same height as the receptacle for providing a flat surface whereby measuring dispensers may be supported in stacked relation,

wherein the material is dispensed from the container through said apparatus by initially tilting the container so that said discharge port points upwardly and material is allowed to flow from the container through said charging port into said measuring volume of said receptacle until the material fills said measuring volume up to a preselected indicia, and then rotating the container so that the measured material falls through said discharge port.

## 4,109,831

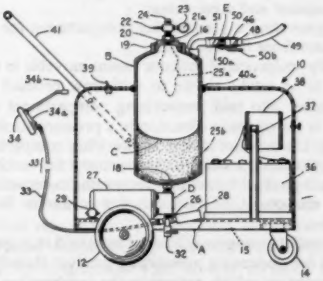
## PORTABLE SELF-CONTAINED LUBRICATING APPARATUS

**William F. Culpepper, and Charles G. Hinkle, both of Greer, S.C., assignors to General Enterprises, Inc., Greer, S.C.**

**Filed Mar. 31, 1977, Ser. No. 783,328**

**Int. Cl.² B67D 5/52**

**U.S. Cl. 222—254** **14 Claims**



1. An improved portable lubricating apparatus of the type having a wheeled frame member, a lubricant container carried on said frame member for containing a lubricant, a pump

means carried on said frame connected to said container for receiving said lubricant having a dispensing outlet for dispensing said lubricant at an elevated pressure, said dispensing outlet adapted for connection to a lubricant delivery hose having a dispensing valve connected to a remote end for controlling the dispensing valve connected to a remote end for controlling the dispensing of pressurized lubricant, and power means for driving said pump means the improvement comprising:

said container including a bottom portion having a discharge outlet connected to an inlet of said pump means,

a coupling member carried by said container communicating with an interior space thereof adapted for connection to a closed lubricant source for filling said container with lubricant,

a flexible bladder member carried within said container interior space having an inlet for receiving a pressurized gas to cause said bladder member to expand and pressurize said lubricant, and

said coupling member and bladder member enabling said container to operate as a generally closed container during filling and dispensing operations under pressure affording total safety to the operator thereof.

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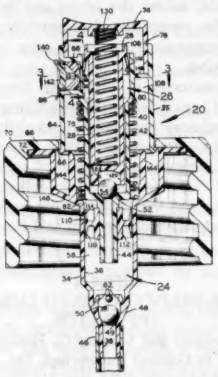
**4,109,832**

## PUMPING SYSTEM HAVING A PRESSURE RELEASE

**Louis F. Kutik, Ft. Lauderdale, and Howard E. Cecil, Miami, both of Fla., assignors to Security Plastics, Inc., Miami Lakes, Fla.**

**Filed May 9, 1977, Ser. No. 795,090**
**Int. Cl.² B67D 5/42**
**U.S. Cl. 222—318** **12 Claims**



1. In a manually operated pumping system for dispensing a fluent product from a container in a substantially non-pulsating discharge, said system having mounting means for attaching it to the container and comprising:

means providing a pressurizing compartment for receiving product from the container;

manually reciprocable actuator means movable in one direction in an intake stroke to withdraw product from the container into said pressurizing compartment and movable in the opposite direction in a pressure stroke to pressurize the product in said pressurizing compartment;

means providing a storage compartment for receiving pressurized product from said pressurizing compartment upon said movement of said actuator means in its pressure stroke;

and an outlet passageway leading from said storage compartment for dispensing pressurized product therefrom;

the improvement which comprises the combination of:

an accumulator piston slidably reciprocable in said storage compartment and operable to open and close said outlet passageway,

spring means biasing said piston to a rest position closing said outlet passageway, said piston being movable by the pressure of product in said storage compartment against the bias of said spring means to open said outlet passageway;

a check valve acting between said pressurizing compartment and said storage compartment, said check valve being operative to pass pressurized product from said pressurizing compartment into said storage compartment for moving said piston to open said outlet passageway upon movement of said actuator means in its pressure stroke, said check valve being operative to block return flow of product from said storage compartment back into said pressurizing compartment upon the following intake stroke of said actuator means whereby to maintain the dispensing of product through said outlet passageway as long as the pressure of product in said storage compartment maintains said piston positioned to open said outlet passageway;

and means on said accumulator piston operable to open said check valve just prior to the closing of said outlet passageway by said accumulator piston during the reciprocation of said piston for relieving pressure in said storage compartment to facilitate closing of said outlet passageway by said piston.

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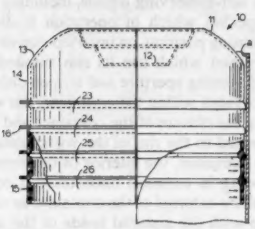
**4,109,833**

## PISTON FOR PRESSURE DISPENSERS OF THE BARRIER PISTON TYPE

**Jerome A. Gross, 6304 S. Rosebury, St. Louis County, Mo. 63105**

**Filed Dec. 17, 1976, Ser. No. 751,396**
**Int. Cl.² B67D 5/54**
**U.S. Cl. 222—386.5** **2 Claims**



1. For use in a pressure dispensing can of generally cylindrical cross-section,

a barrier pack piston, comprising

an inverted cup-like shell molded of a bendable plastic and having an imperforate top portion and a generally cylindrical wall of generally constant thickness joining the top portion, the diameter of the outer surface of said cylindrical wall being sufficiently smaller in diameter than the interior diameter of such can to permit sliding therein, said wall having spaced between its top and bottom extremities

a circumferential sealing provision comprising

a circumferential groove defining a hinge line,

constant thickness perimetrical portions of said wall above and below said groove and there adjoining each other, and

a circumferential wiping rib molded to project perpendicularly from the outer surface of the upper of said perimetrical portions immediately adjacent to said groove to a diameter which exceeds that of the interior of such can,

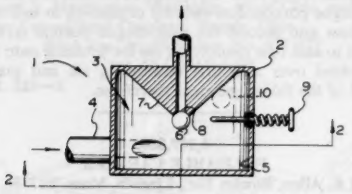
whereby when the piston is in place within such can the wiping rib is pressed inward by its contact with the inner can wall, causing said perimetrical portions to deflect inward at said groove, the said upper perimetrical portion adjacent said hinge line thereby assuming an inward and downward slope and thus positioning the wiping rib slopingly outward and downward.

4,109,834

## CONSTANT VOLUME FLUID DISCHARGING DEVICE

Clyde C. K. Kwok, Montreal, and Essam A. Farag, Pointe Claire, both of Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Feb. 7, 1977, Ser. No. 766,126
Claims priority, application Canada, Mar. 15, 1976, 247879
Int. Cl.[2] G01F *11/28*
U.S. Cl. 222—448 2 Claims



1. A constant volume fluid discharging device comprising:
a. a housing having a cylindrical cavity with a substantially vertical oriented longitudinal axis, said cavity having an upper and lower end, the upper end having a convex surface with a downwardly directed vertex;
b. an inlet connected substantially tangentially to a cylindrical wall of the cavity operative to effect vortical motion of fluid in the cavity;
c. a spherical valve member having a specific gravity less than that of the fluid disposed in the cavity;
d. an outlet at the vertex of the convex surface adapted to be blocked by the valve member; and
e. means for displacing the valve member from the outlet for initiating a discharge cycle.

2. A constant volume fluid discharging device comprising:
a. a housing having a cylindrical cavity with a substantially vertical oriented longitudinal axis, said cavity having an upper and lower end, the lower end having a concave surface, with a downwardly directed vertex;
b. an inlet connected substantially tangentially to a cylindrical wall of the cavity operative to effect vortical motion of fluid in the cavity;
c. a spherical valve member having a specific gravity greater than that of the fluid disposed in the cavity;
d. an outlet at the vertex of the concave surface adapted to be blocked by the valve member;
e. an obstacle disposed on an upper outer portion of the concave surface in front of the inlet; and
f. means for displacing the valve member from the outlet.

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4,109,835

## DEVICE FOR DISPENSING MEASURED QUANTITIES OF MATERIAL

Genaro Afalla Castro, 68 Stuyvesant Ave., Newark, N.J. 07106

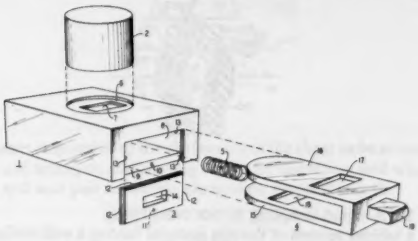
Filed Aug. 12, 1976, Ser. No. 713,980
Int. Cl.[2] G01F *11/40*
U.S. Cl. 222—449 2 Claims

1. A dispenser comprising a support body having interior walls therein defining a first passage through said body and a channel, a portion of said first passage being closed off to define a measuring cavity, and the remaining portion of said first passage providing ingress to and egress from said measuring cavity,

a container mounted on said support body adjacent to the portion of said first passage providing ingress to said cavity,

a first valve plate and a second valve plate slidably mounted in said channel and protruding into said first passage to define a top and bottom of said measuring cavity, said plates cooperating such that said second plate closes the bottom of said cavity while said first plate opens the top of said cavity permitting ingress of material from said container into said cavity, and the top of said cavity is closed by said first plate before said second plate opens the the bottom of said cavity to permit egress of said material in said cavity from said dispenser,

an actuator connected to said first and said second valve plates for operating both said plates, a spring functioning with said actuator, a retainer having an aperture therethrough and being slidably engaged in slots in the side of said support body to permit assembly of said dispenser, said actuator with both said valve plates connected thereto and said spring being inserted into said channel, a force being applied to said actuator to compress said



spring to permit said actuator and said valve plates connected thereto to be completely inserted within said support body before said retainer is slidably engaged in said slots, upon the release of the force applied to said actuator said spring decompresses causing a nose portion of said actuator to protrude through said retainer aperture in a normal first position in which said first valve plate opens the top of said measuring cavity while said second valve plate closes the bottom of said cavity and a force is applied to said actuator nose portion to place said actuator in a second position where said first plate closes the top of said cavity while said second plate opens the bottom of said cavity.

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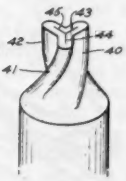
4,109,836

## SELF-SEALING PASTE DISPENSING DEVICE

Anna Falarde, 56 Malvern St., Providence, R.I. 02904

Filed Feb. 10, 1977, Ser. No. 767,359
Int. Cl.[2] B65D *25/42*
U.S. Cl. 222—494 4 Claims



1. A self-sealing paste discharge device comprising a body portion with a neck extending therefrom, said neck having sufficient elasticity for tortional movement under pressure and a closed end with a laterally extending slit to permit the portions on either side of the slit to separate, said neck extending from said closed end presenting a portion of an internal helical path along its longitudinal axis so that as paste is forced through the path there will be a pressure brought to bear on the sides of the path to turn the neck a portion of a revolution about its axis to separate the sides of the path and spread the portion of the closure end on either side of said slit to permit discharge of the paste therethrough, the elasticity of the neck

bringing the portions on either side of the slit together when the pressure of the paste is released.

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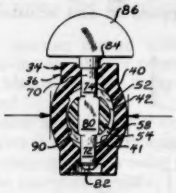
**4,109,837**
**LIQUID SAMPLING DEVICE**
Glenn N. Taylor, Cary, Ill., assignor to The Kendall Company, Boston, Mass.
Filed Dec. 22, 1976, Ser. No. 753,112
Int. Cl.[2] B65D *47/22*; F16K *31/14*
U.S. Cl. 222—556 13 Claims




13. A liquid sampling device comprising:
a tubular section of flexible material having a wall defining a lumen for passage of liquid and defining an outer surface adapted to be pressed by a user's fingers;
a flow control element comprising, a generally circular rigid disc positioned in said lumen, said disc having a larger diameter than the internal diameter of said lumen, said disc having a peripheral edge sealingly engaging against an inner surface of the tubular section at a first angular position of the disc, said tubular section surface being pressed from opposed sides in the vicinity of the disc to deform said wall and permit passage of a liquid sample between the disc and the inner surface of the wall; and
means for rotating said disc to a second angular position with at least a portion of said disc edge spaced from the inner surface of the tubular section to permit rapid passage of liquid through the control element.

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**4,109,838**
**GARMENT HANGER**
Abraham Dwek, 718 Avenue R, Brooklyn, N.Y. 11223
Filed Aug. 1, 1977, Ser. No. 820,764
Int. Cl.[2] A47J *51/14*
U.S. Cl. 223—91 7 Claims

1. A garment hanger comprising a pair of transversely extending shoulders, a hook coupled between said transversely extending shoulders to suspend the garment hanger, sidewalls extending downwardly from said transversely extending shoulders, said transversely extending shoulders and said sidewalls lying in a common plane, rib means connected between the sidewalls and being bowed outwardly in a lateral direction from said common plane to provide form and shape to a garment placed on the hanger, said rib means including at least one arcuate rib, said sidewalls having an upper portion and a lower portion, said upper portion including first arms downwardly depending from an end of each of said transversely extending shoulders, said lower portion including second arms downwardly depending and transversely extending from an end of each of said first arms, a first reinforcing rib being connected between said sidewalls and lying in said common plane, said first reinforcing rib being for supporting a garment folded thereover, a second reinforcing rib being connected between said sidewalls and lying in said common plane, said second reinforcing rib being spaced above said first reinforcing rib, a tongue portion downwardly depending in said common plane from said second rib, said tongue portion terminating adjacent to said first reinforcing rib for pressing onto the garment folded over said first reinforcing rib and preventing slippage of the folded garment therefrom.

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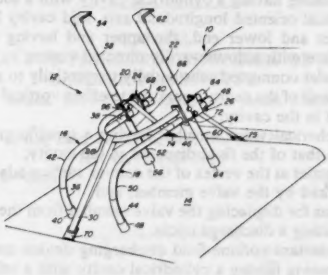
**4,109,839**
**FOLDABLE CARRIER**
Richard A. Allen, Bowles Ter., Lincoln, Mass. 01773
Filed Jun. 24, 1976, Ser. No. 699,495
Int. Cl.[2] B60R *9/10*
U.S. Cl. 224—29 R 12 Claims



1. A foldable carrier mountable on automobiles or the like, said carrier comprising:
(a) a pair of side members;
(b) a pair of carrying members; and
(c) means for interconnecting said side members and said carrying members, one of said side members and one of said carrying members held in spaced relationship to the other one of said side members and the other one of said carrying members by said interconnecting means, one of said side members and one of said carrying members constrained by said interconnecting means for both relative limited rotational movement about and limited slidable movement along a first axis, the other of said side members and the other of said carrying members constrained by said interconnecting means for both relative limited rotational movement about and limited slidable movement along a second axis, each said side members and each said carrying members relatively movable between an extended locked position and a folded collapsed position, said carrying members and said side members disposed in substantially parallel planes when in said folded collapsed position;
(d) said interlocking means including a pair of brackets, each said bracket formed with a notch having an opened portion and a closed portion, each said side member including a latch, said latch of one of said side members received in said opened portion of one of said notches when said one side member is rotated, said latch of the other of said side members received in said opened portion of the other of said notches when said other side member is rotated, said latch of said one side member slid into said closed portion of said one notch when said one side member is slid, said latch of said other side member slid into said closed portion of said other notch when said other said member is slid, said one side member fixed against rotation when said

latch of said one side member is slid into said closed portion of said one notch and said other side member fixed against rotation when said latch of said other side member is slid into said closed portion of said other notch.

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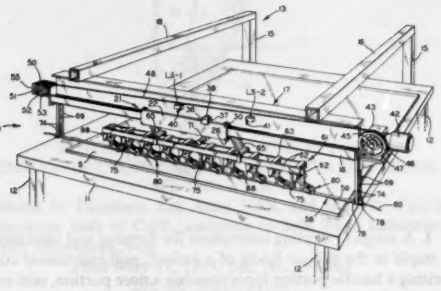
**4,109,840**

## METHOD OF AND APPARATUS FOR THERMALLY SEVERING GLASS

**Waldemar W. Oelke, Rossford; Hans W. Boehm, Toledo, and Richard A. Herrington, Walbridge, all of Ohio, assignors to Libbey-Owens-Ford Company, Toledo, Ohio**

**Filed Apr. 19, 1976, Ser. No. 677,977**
**Int. Cl.[2] B26F *3/08***
**U.S. Cl. 225—2** **4 Claims**



1. A method of cutting relatively thick glass along a desired straight line of cut comprising: providing an elongated hollow heat conductor in the form of a cylindrical rod, placing said heat conductor on an at least one non-scored surface of a relatively thick glass sheet to provide linear line contact therewith coincident with and along a desired straight line of cut, applying heat uniformly to said conductor, transmitting said heat through said conductor via said linear line contact onto said glass surface along said desired straight line of cut, and maintaining continuous linear line contact between said conductor and said non-scored glass surface throughout the entire length of said desired line of cut by applying a moderate, uniform pressure to said conductor with a series of longitudinally aligned rollers reciprocably movable along said conductor in bearing engagement thereagainst to concentrate said heat along said desired line of cut and sever said glass sheet into portions having smooth and even severed edges through and which are truly perpendicular to the major surfaces of the severed glass portions.

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**4,109,841**

## APPARATUS FOR OPENING SCORE LINES IN GLASS SHEETS

**Robert P. DeTorre, Pittsburgh, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed May 26, 1976, Ser. No. 690,337**
**Int. Cl.[2] C03B *33/02***
**U.S. Cl. 225—96.5** **20 Claims**

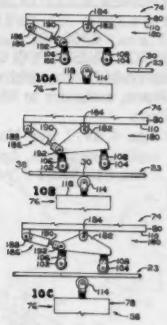
3. An apparatus for severing a sheet of a fracturable material, the sheet having at least one score line extending between a first and a second opposite edge which edges are transverse to a direction of advance, comprising:

means for advancing the sheet to be severed along an article movement path into a severing station;

a rotatably mounted wheel biased toward one side of the article movement path;

a pair of spaced rotatably mounted wheels each biased toward the opposite side of the article movement path;

means mounting said wheel and said pair of wheels for synchronously moving said wheel and said pair of wheels along a path transverse to the article movement path with said wheel spaced from the spaced distance between said pair of wheels; and



means responsive to the movement of the sheet to be severed and acting on said moving means for displacing said wheel and said pair of wheels along their respective path.

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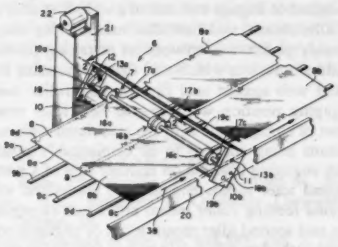
**4,109,842**

## SHEET STRIPPING DEVICE

**John J. Aquilla, c/o Converted Paper Prod., 1529 Dean St., Brooklyn, N.Y. 11213**

**Filed Feb. 13, 1975, Ser. No. 549,517**
**Int. Cl.[2] B65H *35/10*; B26F *3/02***
**U.S. Cl. 225—98** **4 Claims**



1. A stripping device comprising in combination: conveyor means for transporting a sheet structure along a first plane in a predetermined direction, where said sheet structure has a major section connected intermittently to a minor section of lesser surface area extending along said major section in a direction substantially parallel to said first direction; a projection structure having sides thereof extending in a substantially upright plane substantially parallel to said first direction and positioned at a predetermined laterally located position relative to said conveyor means adapted such that when said conveyor means transports said sheet structure in said first direction, said projection structure is positioned such that a forward face thereof intercepts a leading edge of said minor section to result in a stripping of the minor section from the major section and adapted such that the major section is thereafter conveyed continually by conveyor means to a predetermined point beyond said projection structure, and pincher surfaces in opposing relationship to oneanother positioned above and below said first plane and adapted such that during transport of said sheet structure, said pincher surfaces anchor said major section of the sheet structure during movement of said minor section against said projection structure, said projection structure being laterally adjacent said pincher surfaces and adapted such that stripping away of the minor section from the major section is facilitated thereby, said pincher surfaces

comprising opposing roller surfaces mounted such that adjacent surfaces move in a common direction.

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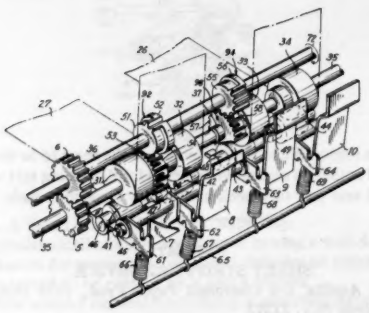
**4,109,843**

## WEB FEEDING MECHANISM FOR COMPACT PRINTER

**Kiyofumi Usui; Shigeyoshi Hirabayashi, and Hiroshi Hosogaya, all of Shiojiri, Japan, assignors to Shinshu Seiki Kabushiki Kaisha, Suwa, Japan**

**Filed Apr. 4, 1977, Ser. No. 784,393**
**Claims priority, application Japan, Apr. 2, 1976, 51-37555**
**Int. Cl.² B65H *17/42***
**U.S. Cl. 226—109** **19 Claims**



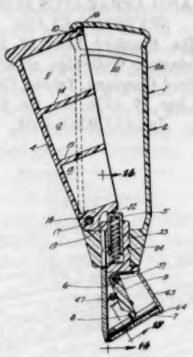
1. A web feeding mechanism for feeding at least one web comprising first web feeding roller means and second web feeding roller means, each of said web feeding roller means being adapted to engage one side of a web, first idler means and second idler means, said first idler means being adapted to be displaceably positioned between an engaging position on another side of a web at which said first idler means engages the associated web against said first feeding roller means and a non-engaging position wherein said first idler means is disposed out of engagement with the associated web, said second idler means being adapted to be displaceably positioned between an engaging position on another side of a web at which said second idler means engages the associated web against said second feeding roller means and a non-engaging position wherein said second idler means is out of engagement with the associated web, first drive gear means coupled to said first web feeding roller means for driving said first web feeding roller means to advance the associated web at a first predetermined rate when said first idler means is disposed in said engaging position, second drive gear means coupled to said second web feeding roller means for driving said second web feeding roller means to advance the associated web at a second predetermined rate when said second idler means is displaced in said engaging position, each of said first and second drive gear means comprising a first driving gear having n teeth, a first driven gear having m teeth cooperatively engageable with said first driving gear, a second driving gear having n-1 notches disposed in the periphery thereof and mounted for rotation with said first driving gear, a second driven gear having m/2 teeth and mounted for rotation with said first driven gear, said n-1 notches in said second driving gear engaging said m/2 teeth on said second driven gear when said n teeth on said first driving gear are in engagement with said m teeth of said first driven wheel, each said second driving gears including a peripheral region outside of the region of said *n*-1 notches for abutting intermediate two of said *m*/2 teeth on said second driven gear for preventing said second driven gear from rotating when said *n* teeth of said first driving gear are out of engagement with said m teeth of said first driven gear, and idler displacement means for selectively displacing said first and second idler means between their respective engaging positions and non-engaging positions.

**4,109,844**

## SURGICAL STAPLING INSTRUMENT

**Carl T. Becht, Cincinnati, Ohio, assignor to Senco Products, Inc., Cincinnati, Ohio**

**Filed Nov. 18, 1976, Ser. No. 742,843**
**Int. Cl.² B25C *5/02***
**U.S. Cl. 227—120** **14 Claims**



1. A surgical stapling instrument for forming and implanting a staple in the skin or fascia of a patient, said instrument comprising a handle portion incorporating a nose portion, said nose portion having an anvil plate at the bottom end thereof, said anvil plate terminating at its forward end in a coextensive anvil surface, said anvil plate being adapted to slidably mount a row of staples, means to constantly urge and advance said row of staples along said anvil plate to place a forwardmost staple of said row on said anvil surface, a staple driver mounted in said nose portion and shiftable vertically between a normal upper position closely adjacent said forwardmost staple on said anvil surface and a lower position wherein it forms and implants said forwardmost staple about said anvil surface, and means to shift said staple driver between said upper and lower positions thereof.

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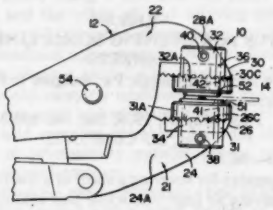
**4,109,845**

## SNAP DIES

**Donald G. Wedge, 2008 Riverside Dr. E., Bradenton, Fla. 33508, and Albert W. Zirkelbach, 2819 62nd Ave. East, Bradenton, Fla. 33505**

**Filed Aug. 22, 1977, Ser. No. 826,415**
**Int. Cl.² B25C *7/00***
**U.S. Cl. 227—144** **10 Claims**



1. A device for attaching a snap fastener having a first and a second snap fastener portion to a material, the device being adapted for use with pliers, having a first and a second plier jaw, comprising in combination:

a first and a second support unit capable of mounting to the first and the second plier jaws, respectively;

first and second threaded fastening means for respectively securing said first and said second support units to the first and the second plier jaws;

first die insert means including a projection for locating the first snap fastener portion of the snap fastener relative to said first die insert means;

second die insert means including internal resilient means for locating the second snap fastener portion of the snap fastener relative to said second die insert means; and

first and second aperture means in said first and said second support units for respectively receiving said first and said second die insert means enabling the materal to be interposed between said first and said second die insert means when the first and the second plier jaws are in an open position and for attaching the first and the second snap fastener portions to the material when the first and the second plier jaws are moved to a closed position.

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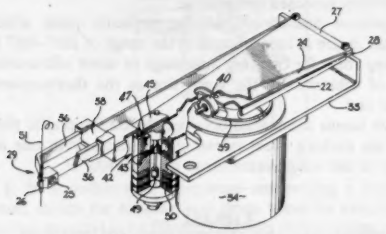
**4,109,846**

## AUTOMATIC HEIGHT SENSOR FOR SEMICONDUCTOR BONDING TOOL, WAFER PROBE OR THE LIKE

**Matheus D. Pennings, Los Altos Hills, and Billy B. Tippin, Saratoga, both of Calif., assignors to Sola Basic Industries, Inc., Milwaukee, Wis.**

**Filed May 17, 1977, Ser. No. 797,622**
**Int. Cl.[2] H01L *21/68***
**U.S. Cl. 228—4.5** **13 Claims**



1. In an automatic semiconductor bonder or prober employing a bonding or probing tool, an apparatus for controlling the movement of said bonding or probing tool generally transverse to a surface comprising:

a first arm mounted for transverse movement relative to said surface, said first arm including said bonding or probing tool;

a second arm mounted for movement with said first arm;

coupling means for coupling said first arm to said second arm, said coupling means decoupling said first arm from said second arm when said tool contacts a bonding pad, lead frame or the like;

sensing means for sensing relative movement between said first and second arms;

recording means responsive to said sensing means for recording a parameter which is a function of the position of said tool when said relative movement occurs; and

drive means coupled to said second arm for driving said second arm and said first arm when said first arm is coupled to said second arm by said coupling means;

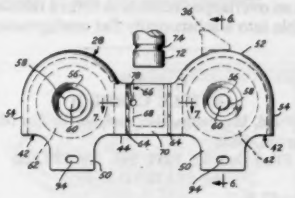
whereby when said tool engages said bonding pad, lead frame, or the like which is on said surface, said first and second arms separate and said recording means records a parameter which is a function of the position of said tool, thereby allowing a height determination of such bonding pad, lead frame, or the like.

**4,109,847**

## METHOD FOR REPLACING DIFFERENT RAILROAD CAR DOOR ROLLER ASSEMBLIES

**John D. Bailey, Orland Park, Ill., assignor to Railway Engineering & Supply Company, Inc., Oak Lawn, Ill.**

**Filed May 3, 1976, Ser. No. 682,462**
**Int. Cl.[2] E05D *13/02*; B61D *19/00***
**U.S. Cl. 228—119** **5 Claims**



1. A method for selectively replacing any of a plurality of different types of railroad car door roller assemblies, used with different types of railroad car door tracks, said method comprising the steps of supplying a roller assembly replacement kit which includes a housing having a pair of spaced end sections, each of said end sections being constructed and arranged to rotatably support a roller member for movement on a cooperating one of said tracks, each of said end sections having a pair of opposed side walls with downwardly projecting feet, an intermediate section for rigidly interconnecting said end sections, an upright aperture in said intermediate section, said kit also including separate guide members, a hook member, and at least one separate threaded member, said method further comprising the steps of threading said upright aperture of said housing, and threadably securing one of said threaded members into said threaded aperture, said housing with said threaded member thereby being a replacement for one of said types of said roller assemblies for use in connection with one of said tracks.

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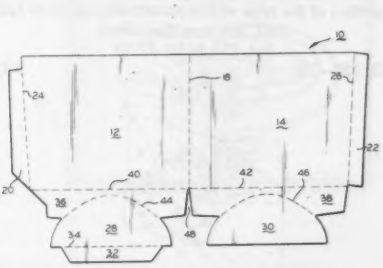
**4,109,848**

## TUBULAR CARTON

**Michael A. Kipp, Phoenixville, Pa., and Arne H. Brauner, Greensboro, N.C., assignors to Container Corporation of America, Chicago, Ill.**

**Continuation-in-part of Ser. No. 654,889, Feb. 3, 1976, abandoned. This application Feb. 3, 1977, Ser. No. 765,241**
**Int. Cl.[2] B65D *3/04***
**U.S. Cl. 229—21** **1 Claim**



1. A tubular carton formed from a cut and scored blank of paperboard, or the like, comprising:

(a) a side wall formed from a plurality of body panels arranged in a side-by-side relation, with adjoining panels being foldably connected to each other along a score line;

(b) a recessed, concavely depressed bottom wall formed from at least two ovelapping bottom panel portions secured to each other;

(c) each of said body panels being connected to a corresponding one of said bottom panel portions by an intermediate panel;
(d) said intermediate panel and said body panel being substantially of equal length and being foldably connected along the entire length of their adjacent edges;
(e) said intermediate panel being foldably connected to a bottom panel portion along a concave/convex fold line;
(f) said side wall having remote side edges secured to each other in an overlapped relation to form a tubular structure collapsible into a substantially flat configuration.

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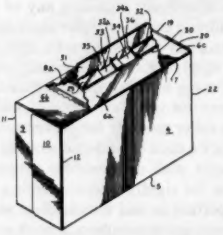
**4,109,849**
**ARTICLE CARRIER**
**Prentice J. Wood, Hapeville, Ga., assignor to The Mead Corporation, Dayton, Ohio**
**Filed Dec. 12, 1977, Ser. No. 859,336**
**Int. Cl.[2] B65D *5/46***
**U.S. Cl. 229—52 B** **11 Claims**



1. In a hexagonal article carrier, lifting means comprises a pair of face contacting handle panels, a pair of stress relieving panels foldably joined respectively to said handle panels, an outer top wall foldably joined to one of said stress relieving panels remote from said handle panel, an inner top wall foldably joined to the other of said stress relieving panels remote from said handle panel, and each of said stress relieving panels being adapted to shift from a position in substantially the same plane as the associated handle panel to a position in substantially the same plane as the associated top wall when said lifting means is manipulated.

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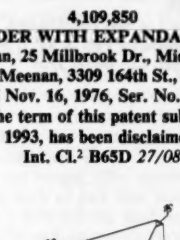
**4,109,850**
**FILE FOLDER WITH EXPANDABLE POCKET**
**Vincent D. Meenan, 25 Millbrook Dr., Middletown, N.J. 07748, and Thomas P. Meenan, 3309 164th St., Flushing, N.Y. 11358**
**Filed Nov. 16, 1976, Ser. No. 742,300**
**The portion of the term of this patent subsequent to Jan. 20, 1993, has been disclaimed.**
**Int. Cl.[2] B65D *27/08***
**U.S. Cl. 229—72** **9 Claims**



1. In a file folder formed from a single flat sheet having a front leaf, a back leaf, a side leaf and a bottom leaf extending from said back leaf in which a pocket for containing filing material is formed by the back, side and bottom leaves and in which upper edges of said front, back, side and bottom leaves are open and exposed for permitting ready insertion and withdrawal of papers, the improvement which comprises slidable means including a T shaped tab on said bottom leaf, said bottom leaf being folded over said back leaf, and guiding means having spaced slits for said sliding means on said side leaf for adjustably arranging said pocket, said side leaf being folded over said bottom leaf and also over said back leaf, said T shaped tab being folded over a side edge of said side leaf for mesh engagement of said tab with said slits whereby, when said tab and slits are interconnected, said pocket can be expanded or contracted as filing material is added to or removed from said pocket.

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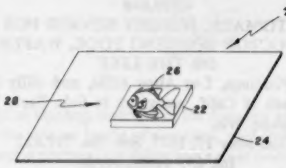
**4,109,851**
**NOVELTY POSTCARD AND METHOD**
**Delbert T. Goates, 1275 Chandler Dr., Salt Lake City, Utah 84103**
**Continuation-in-part of Ser. No. 426,774, Dec. 20, 1973, abandoned. This application Jul. 21, 1975, Ser. No. 597,728**
**Int. Cl.[2] B32B *31/26*; B29G *27/20*; B42D *15/02***
**U.S. Cl. 229—92.8** **5 Claims**



1. A novelty postcard comprising:
an imprinted heat-shrinkable thermoplastic plate which shrinks in size at temperatures in the range of 200°–400° F;
a backing sheet for carrying a message or other information and of substantially the same size as the thermoplastic plate; and
adhesive means distributed between the thermoplastic plate and the backing sheet releasing the sheets from one another in the temperature range of 200°–400° F.

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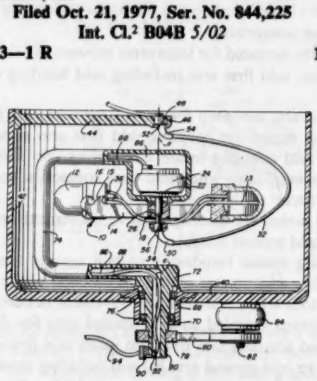
**4,109,852**
**CENTRIFUGAL STRAIN RELIEF SHEATH FOR PROCESSING APPARATUS**
**Richard I. Brown, Northbrook, and Daniel R. Boggs, Vernon Hills, both of Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.**
**Filed Oct. 21, 1977, Ser. No. 844,225**
**Int. Cl.[2] B04B *5/02***
**U.S. Cl. 233—1 R** **10 Claims**



1. Centrifugal processing apparatus, including:
a stationary base;
a processing chamber rotatably mounted with respect to said base for rotation about a predetermined axis;

a flexible umbilical cable segment for establishing communication with said processing chamber, one end of said cable segment being fixed with respect to said base substantially along said axis at one side of the processing chamber, the other end of the cable segment being attached substantially on said axis in rotationally locked engagement to the processing chamber, the improvement comprising, in combination:

a flexible sheath member carried by said umbilical cable segment,

means connecting said flexible sheath member to said axis,

said flexible sheath member having a shank portion which extends from said axis and along a portion of said cable segment, and

said shank portion having a thickness which decreases along said cable segment in the direction away from said connecting means.

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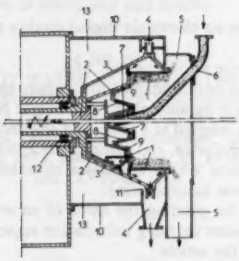
## 4,109,853
## CENTRIFUGAL FILTER PRESS

**Ernst Rüegg, Kusnacht, Switzerland, assignor to De Dietrich & Cie, S.A., Niederbronn-les-Bains, France**

**Filed Apr. 26, 1977, Ser. No. 790,995**
**Int. Cl.[2] B04B** *1/12, 7/04, 15/06*
**U.S. Cl. 233—2** **3 Claims**



1. In a pusher-type centrifuge comprising a rotary filter drum, means for rotating said drum about its axis, means for feeding material to be filtered centrally of said drum, said drum having a cone along which said material moves radially outwardly and a cylindrical filter coaxial with the drum that subsequently receives said material and separates solids in said material from liquids in said material, the liquids passing radially outwardly through the filter and the solids leaving the filter axially endwise; the improvement in which there are a plurality of said cones concentric with each other and opening in alternately opposite axial directions along the path of said material between said feeding means and said filter, the radially outermost of said cones feeding said material directly to said filter, means to separately remove liquid and solids from adjacent the periphery of said drum, a shaft on which said drum is mounted for rotation, bearings supporting said shaft for rotation, and a fixed casing surrounding and enclosing said drum and bearings, said removing means for liquid filtrate comprising venturi means for educting vapor from within said casing but outside said drum thereby to remove vapor from the vicinity of said bearings.

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## 4,109,854
## CENTRIFUGAL APPARATUS WITH OUTER ENCLOSURE

**Richard I. Brown, Northbrook, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.**

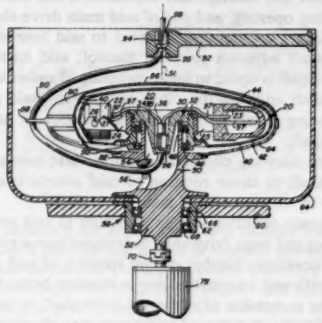
**Filed Jun. 13, 1977, Ser. No. 805,950**
**Int. Cl.[2] B04B** *5/02, 9/00*
**U.S. Cl. 233—25** **9 Claims**

1. Centrifugal processing apparatus, which comprises:

a stationary base;

a processing chamber rotatably mounted with respect to said base for rotation about a predetermined axis;

a flexible umbilical cable segment for establishing fluid communication with said processing chamber, one end of said cable segment being fixed with respect to said base substantially along said axis at one side of said processing chamber, the other end of said cable segment being attached substantially on said axis in rotationally locked engagement to said processing chamber;



means for rotating said processing chamber and said cable segment in the same direction with a speed ratio of 2:1, respectively;

an outer enclosure positioned about said processing chamber and being symmetrically dimensioned about said axis, said outer enclosure being positioned intermediate said processing chamber and said cable segment; and

said rotating means coupling said outer enclosure to said processing chamber, permitting said outer enclosure to rotate at one-half the speed of said processing chamber.

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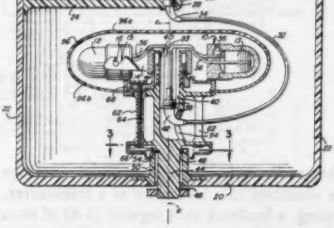
## 4,109,855
## DRIVE SYSTEM FOR CENTRIFUGAL PROCESSING APPARATUS

**Richard I. Brown, Northbrook, and Joseph Kevin Duffy, Buffalo Grove, both of Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.**

**Filed Oct. 25, 1977, Ser. No. 844,607**
**Int. Cl.[2] B04B** *5/02, 9/08*
**U.S. Cl. 233—25** **13 Claims**



1. Centrifugal processing apparatus, including:

a stationary base;

a processing chamber rotatably mounted with respect to said base for rotation about a predetermined axis;

a flexible umbilical cable segment for establishing communication with said processing chamber, one end of said cable segment being fixed with respect to said base substantially along said axis at one side of the processing chamber, the other end of the cable segment being attached substantially on said axis in rotationally locked engagement to the

processing chamber, the improvement comprising, in combination:

a main drive shaft connected to said processing chamber, said main drive shaft being coaxial with said predetermined axis;

means for driving said main drive shaft at one $\omega$;

said main drive shaft defining a central bore and an opening extending radially from said central bore to the outside of said main drive shaft, said cable segment extending from said other end through said central bore and said radially extending opening, and out of said main drive shaft;

a transmission countershaft coupled to said base and main drive shaft adjacent one end thereof, said transmission countershaft coupled to said processing chamber and main drive shaft adjacent the other end thereof, said countershaft being parallely located with respect to said main drive shaft;

first means coupling said countershaft to said base and main drive shaft to cause rotation of said countershaft in response to rotation of said main drive shaft;

second means coupling said countershaft to said processing chamber and main drive shaft to transmit one $\omega$ rotation to said processing chamber during rotation of said countershaft with said transmitted one $\omega$ rotation being added to said one $\omega$ rotation of said main drive shaft to result in a total of two $\omega$ rotation of said processing chamber during one $\omega$ rotation of said main drive shaft.

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**4,109,856**

## METHOD FOR TRANSMITTING BINARY SIGNALS

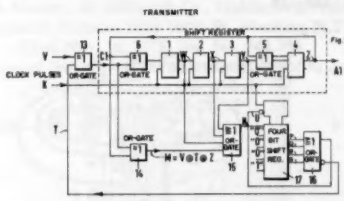
**Marius van Beveren, Leidschendam, and Peerke Jan Nuhoff, Alphen aan de Rijn, both of Netherlands, assignors to De Staat der Nederlanden, Te Dezen Vertegenwoordigd Door de Directeur-Generaal der Posterijen, Telegrafie en Telefonie, The Hague, Netherlands**

**Filed May 10, 1976, Ser. No. 684,565**

**Claims priority, application Netherlands, May 14, 1975, 7505680**

**Int. Cl.[2] G06F *11/00***

**U.S. Cl. 235—308** **10 Claims**




3. Device for ending a predetermined repetition of a degenerative condition in a scrambler at a transmitter, said device comprising: a feedback shift register (1–6) of storage elements (1–4) for producing a maximum length series, an exclusive input OR-gate (13) connected to said feedback shift register, an OR-gate (15) connected to said elements, a second shift register (17) connected to the output of said OR-gate (15) whereby after the fixed number of clock periods a degenerative condition can be detected, a second OR-gate (16) connected to said second shift-register, which second OR-gate (16) is connected on the one side to said exclusive input OR-gate (13), and on the other side to the parallel read input (U) of said second shift register (17), which has such a read condition that only one bit of the input signal can be inverted.

**4,109,857**

## AUTOMATIC UNIT PRICE SETTING APPARATUS OF ELECTRONIC DIGITAL DISPLAY SCALE WITH PRINTING DEVICE

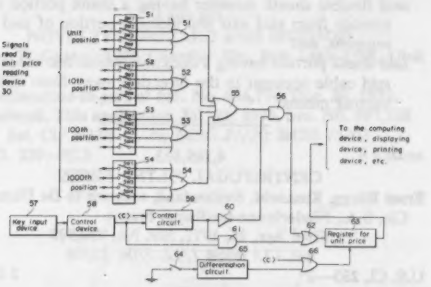
**Kazuharu Terasoka; Mitsuru Sato, and Masao Mineo, all of Tokyo, Japan, assignors to Teraoka Seikosho Co., Ltd., Tokyo, Japan**

**Filed Mar. 4, 1976, Ser. No. 663,932**

**Claims priority, application Japan, Jul. 1, 1975, 50-77916**

**Int. Cl.[2] G06K *15/02*; G01G *23/38, 19/04***

**U.S. Cl. 235—378** **14 Claims**




1. For use in an electronic digital display scale of the kind including:

(a) a unit price setting section, and

(b) a printing device adapted to compute and display a price of an article by multiplying the weight of the article by a unit price inserted in a scale, and adapted to print a name, weight, unit price, and price of the article;

the improvement which comprises an automatic unit price setting apparatus incorporating:

(i) a stamp for printing the name of an article, said stamp having means carrying information appertaining to a unit price for the article

(ii) detecting means for reading said information means of a stamp presented to it, and passing the unit price to the printing device.

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**4,109,858**

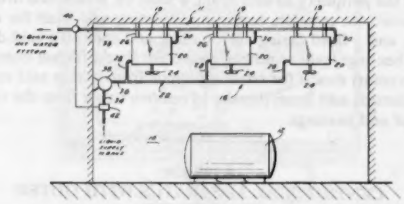
## SYSTEM FOR THE UTILIZATION OF WASTE HEAT FROM A BOILER ROOM TO HEAT A FLUID MEDIUM AND LOWER THE AMBIENT TEMPERATURE OF A BOILER ROOM

**Manfred Moses, 29 Huntley Rd., Eastchester, N.Y. 10709**

**Continuation-in-part of Ser. No. 666,444, Mar. 12, 1976, abandoned. This application Jun. 6, 1977, Ser. No. 803,540**

**Int. Cl.[2] F24D *3/02, 9/00***

**U.S. Cl. 237—8 R** **7 Claims**



1. A heat recovery system, in combination with a boiler room for the removal and utilization of waste heat from said boiler room by passing a liquid in heat exchange relation with heated boiler room air and thereafter removing the heated liquid from the system, comprising:

heat exchange means mounted in said boiler room and in-

cluding at least one heat exchanger operable to maintain liquid flowing therethrough in heat exchange relation with the air in said boiler room;

liquid distribution system including conduit means operable to conduct liquid into said heat exchanger, outlet means operable to conduct liquid away from said heat exchanger and externally of said boiler room; pump means to pump or move the liquid through the heat recovery system whereby liquid may be pumped through said heat exchanger and thereafter externally of said boiler room, thereby to remove heat from the boiler room air and from said boiler room, lowering the ambient temperature in said boiler room while simultaneously utilizing the heat to raise the temperature of the liquid; and

a liquid supply operably connected to said pump means through an inlet to said pump, whereby liquid may be supplied to said pump and consequently to the system to replenish liquid which is continuously exhausted from the system;

said liquid distribution system further comprising a temperature sensor operably mounted on said outlet means to sense the temperature of the liquid flowing through said outlet means, and a heat responsive control valve operably mounted in the inlet to said pump and operably connected to said temperature sensor whereby the temperature of the liquid flowing through said outlet means controls the flow of liquid into said system.

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**4,109,859**

## HOT WATER FLOOR HEATER

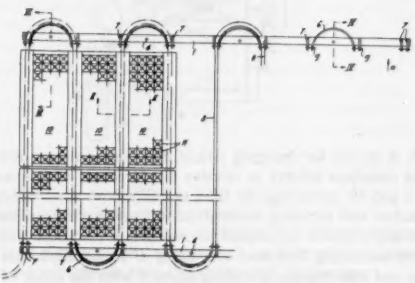
**Felix Dürst, CH-8165 Oberweningen-Schöfflisdorf, Switzerland**

**Filed Jun. 7, 1976, Ser. No. 693,155**

**Claims priority, application Switzerland, Jun. 9, 1975, 7393/75; Nov. 12, 1975, 14628/75; Apr. 23, 1976, 5108/76**

**Int. Cl.² F24H *9/08***

**U.S. Cl. 237—69** **23 Claims**



1. In floor hot water heater in the form of a hot water-carrying pipe coil for support on a base and having spaced substantially rectilinear parallel pipe ducts interconnected by pipe bends, the improvement comprising, in combination, a plurality of horizontally curved members spaced longitudinally in two rows at fixed distances from each other substantially equal to the distance between two adjacent pipe ducts, with the rows being spaced laterally by a distance of the order of the length of said pipe ducts and the curved members of each row facing those in the other row and staggered relative to the curved members in such other row; and a pair of relatively elongated laths extending transversely of said pipe ducts and secured on the support base; said horizontally curved members being fixedly secured on the upper surfaces of said laths to extend upwardly therefrom; the pipe forming said pipe coil being bent around said horizontally curved members, and said horizontally curved members serving as gauges for the bending of the pipe to form the coil and for accurate parallel spacing of said pipe ducts.

**4,109,860**

## RAIL SPRING CLIP WITH TENSION LIMITING FEATURE

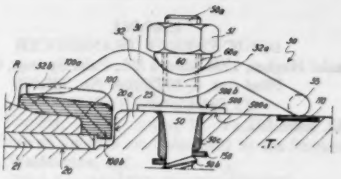
**Marian A. Serafin, Paris, and Maurice Decubber, Beaumont S. Oise, both of France, assignors to Societe Anonyme de Traverses en Beton Arme - Systeme Vagneux, France**

**Filed Mar. 22, 1976, Ser. No. 669,230**

**Claims priority, application France, Mar. 26, 1975, 75 09486**

**Int. Cl.² E01B *9/34***

**U.S. Cl. 238—349** **6 Claims**



1. An assembly for fixing a rail to a railway track sleeper, comprising a bolt having its lower portion embedded in the sleeper and threads on the upper portion thereof, a nut having threads in engagement with the threads of said bolt, a deformable resilient clip disposed around the bolt below said nut, said clip being an elongated member, one end of which engages the rail flange and the other end of which engages said sleeper, whereby tightening of said nut results in the downward deformation of said clip placing same under clamping stress and in the application of force on the rail by said clip to clamp said rail to said sleeper, a rigid shoulder on said bolt which serves as an abutment, said shoulder being of a size and positioned relative to said clip, rail and sleeper so that tightening of the nut results in said clip and shoulder contacting at a point which prevents any possibility of excess tightening able to create inopportune deformations of the clip or excessive extraction forces on said bolt while the clip provides sufficient clamping force.

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**4,109,861**

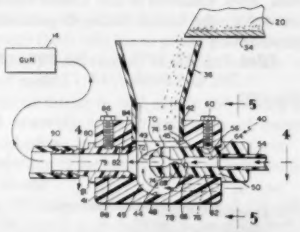
## ELECTROSTATIC FLOCKING SYSTEM

**John P. McHugh, Indianapolis, Ind., assignor to Solar Suede Corporation, Lexington, Ky.**

**Filed Sep. 16, 1976, Ser. No. 724,029**

**Int. Cl.² B05B *5/02***

**U.S. Cl. 239—15** **8 Claims**




1. An electrostatic flocking system comprising an air flow pump having a central chamber with an air inlet and, a flock inlet, opening into said chamber and a chamber outlet connected with said chamber; said air inlet having a forwardly directed channel and a plurality of angularly disposed channels opening into said chamber and means in said inlet for accelerating air passing through said air inlet into said chamber; air supply means for supplying air through said air inlet into said chamber; flock supply means for supplying flock fibers through said flock inlet into said chamber; said chamber having an arcuately recessed bottom wall; an auxiliary air inlet

port spaced from said air inlet and opening into the recessed portion of the bottom wall of the chamber; said flock fibers being entrained with the air in said chamber and exiting the chamber with the air through said outlet; an applicator gun having a barrel opening formed therethrough; means interconnecting said outlet and said gun at one end of the barrel opening of that the air and entrained flock fibers pass through the barrel opening; and charging means on said gun for electrostatically charging the flock fibers passing through the barrel opening.

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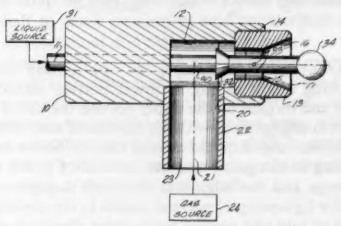
**4,109,862**

## SONIC ENERGY TRANSDUCER

**Nathaniel Hughes, 1934 Sonora Rd., Palm Springs, Calif. 92262**

**Filed Apr. 8, 1977, Ser. No. 785,838**
**Int. Cl.[2] B05B *17/06***
**U.S. Cl. 239—102** **25 Claims**




1. A sonic energy transducer comprising:
a fluid inlet;
a fluid outlet;
a flow passage having a restriction between the inlet and the outlet;
a hollow rod extending along the passage, the rod having one or more holes near the restriction;
a frustum mounted on the rod in the flow passage between the inlet and the restriction, the frustum having a base facing away from the restriction and an apex facing toward the restriction; and
a source of liquid to be atomized connected to the rod to feed the liquid to the restriction.

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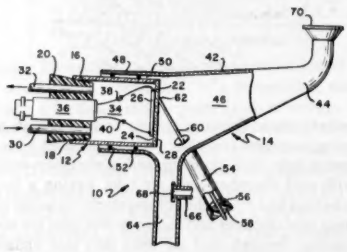
**4,109,863**

## APPARATUS FOR ULTRASONIC NEBULIZATION

**Kenneth W. Olson; William J. Haas, Jr., and Velmer A. Fassel, all of Ames, Iowa, assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Aug. 17, 1977, Ser. No. 825,519**
**Int. Cl.[2] B05B *3/14, 17/06***
**U.S. Cl. 239—102** **5 Claims**



1. A sample nebulizing system for nebulizing a liquid sample or suspension into a carrier gas to form an aerosol comprising:
a. a first hollow body having a first open end and a second end enclosed by a flat plate selected from the group consisting of glass and fused quartz, the plate having an inner face within the body and an outer nebulizing face;
b. ultrasonic transducer means bonded to the inner face of the plate for transmitting ultrasonic vibrations to the nebulizing face;
c. sealing means in the open end of the first body for enclosing a cooling chamber;
d. coolant circulating means in the sealing means for passing a coolant through the chamber for cooling the transducer means;
e. a second hollow body enclosing an aerosol mixing chamber, the body having an opening for receiving the enclosed end of the first body including means for sealing the first body in the opening;
f. sample delivery means in the second body for delivering a sample to the nebulizing face to be nebulized into the mixing chamber;
g. carrier gas inlet means in the second body for introducing a carrier gas into the mixing chamber to transport an aerosol of the nebulized sample;
h. an aerosol outlet in the second body for removing the aerosol from the mixing chamber; and
i. drain means in the second body for removing condensed aerosol and unnebulized sample from the mixing chamber.

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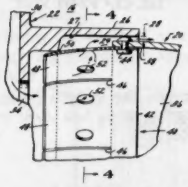
**4,109,864**

## COOLANT FLOW METERING DEVICE

**Thomas S. Clayton, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio**

**Filed Dec. 23, 1976, Ser. No. 753,950**
**Int. Cl.[2] B64D *33/04***
**U.S. Cl. 239—127.3** **11 Claims**



1. A device for metering a fluid flow between two overlapping members subject to relative displacement and separated by a gap for spreading the fluid as a film over the overlapped member, said metering device comprising a flexible seal having one end which is connected to one of said members with the other end being free, said seal being of such length that said free end will engage in sealing contact with the other of said members when urged outwardly by the fluid, said seal further including orifice means for providing an essentially constant flow area through which the flow passes irrespective of the size of the gap due to differences in relative displacement of said members.

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**4,109,865**

## TRACTOR SPRAY CYLINDER ATTACHMENT

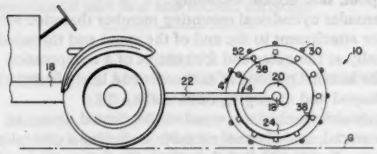
**Jorge E. Hurtado T, 43-72 35th St., Barranquilla -Atl., Colombia, and Diogenes A. Arrieta, 34-47 90th St.-53H, Jackson Heights, N.Y. 11372**

**Filed Apr. 7, 1977, Ser. No. 785,419**
**Int. Cl.[2] B05B *9/06***
**U.S. Cl. 239—147** **4 Claims**

1. A spray attachment for a tractor comprising:
a tank adapted to receive liquids to be sprayed onto an agricultural field,
a wheel secured to each end of said tank having a hollow interior in communication with the interior of said tank,
a plurality of pistons mounted about the circumference of

each wheel in a cylinder having an opening in the bottom thereof in communication with the interior of each of said wheels,

each of said pistons including a piston rod having a head for engagement with the ground sequentially as said wheel rotates along said ground to pressurize the interior of each of said wheels and said tank,



a series of spray orifices spaced about a side wall of each of said wheels in communication with the interior of each of said wheels for dispensing liquid from the interior of each of said wheels to an exterior field under cultivation, and

valve means selectively operable to open and close said orifices in response to the position of said orifice on said wheel.

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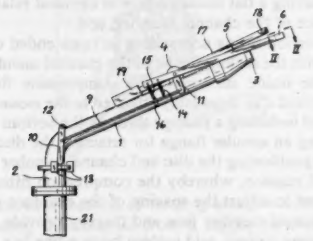
**4,109,866**

## RECIPROCABLE SPRINKLER

**Gerhard Brandl, Leonhardstrasse 79, A-8010 Graz, Austria**

**Filed Apr. 11, 1977, Ser. No. 786,395**
**Claims priority, application Austria, Apr. 9, 1976, 2607/76**
**Int. Cl.² B05B *3/08***
**U.S. Cl. 239—233** **9 Claims**



1. A sprinkler comprising:

a standpipe rising from the ground;

a barrel journaled on said standpipe for limited rotation about a substantially vertical axis, said barrel terminating in a spray nozzle remote from its axis of rotation;

a forward-driving arm and a reverse-driving arm vertically oscillatable on said barrel, said arms having outer extremities terminating in deflecting heads remote from said axis of rotation with surfaces intercepting a water spray from said nozzle for displacing said barrel in a respective direction of rotation upon a lowering of the respective deflecting head from a retracted position above the water spray into operative alignment with said nozzle;

stop means on said standpipe coacting with said arms for retracting the deflecting head of said reverse-driving arm in an initial rotary position while operatively aligning the deflecting head of said forward-driving arm and for upwardly retracting the deflecting head of said forward-driving arm in a terminal rotary position while operatively aligning the deflecting head of said reverse-driving arm, the deflecting head of said reverse-driving arm having a plurality of lands differently inclined to the nozzle axis, said lands including a reaction face and a ramp face adapted to lower said reaction face into a position of confrontation with said nozzle upon being struck by the water spray; and

biasing means with a nonlinear characteristic on said barrel engaging said reverse-driving arm for yieldably arresting said reaction face in line with said nozzle, against a deflecting force of said water spray, by a restoring force intensifying in said position of confrontation.

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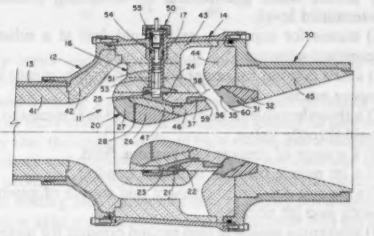
**4,109,867**

## TWO-POSITION NOZZLE

**Charles E. Ebeling, Jr., Ridgeley, W. Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jan. 14, 1977, Ser. No. 759,593**
**Int. Cl.² B64D *33/04***
**U.S. Cl. 239—265.15** **10 Claims**



1. A dual-position assembly for a dual-thrust rocket motor nozzle having a stationary outer support structure and throat support means extending radially into the combustion chamber from said outer support structure comprising:

a combined boost and sustain nozzle throat assembly and means slidably securing said combined assembly to said throat support means,

said combined assembly held in the forward position to form an enlarged throat area during boost phase operation of said rocket motor;

means remotely operated for selectively releasing said combined assembly substantially at the termination of boost phase operation,

said combined assembly movable upon the urging of exhaust gases from said boost phase position aft to a sustain phase position upon actuation of said remotely operated means;

stationary throat means in said nozzle for joining with said combined assembly at the termination of transition between boost phase and sustain phase operation,

said throat support means including at least three equally spaced struts;

annular support means secured to said struts for receiving in sliding relationship said combined assembly,

said means remotely operated including restraining means preventing aft movement of said combined assembly in the presence of exhaust gases and means for selectively releasing said combined assembly to permit aft movement thereof to form said sustain nozzle; and

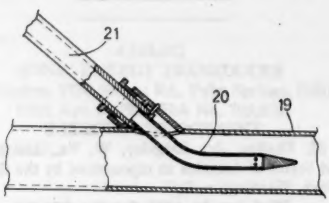
an inner metal ring in said annular support means secured to said struts and a sustain nozzle support ring slidably conforming to at least a portion of the inner surface of said inner metal ring, and said restraining means including a groove in said inner metal ring and a retaining ring releasably engaged in said groove when said combined assembly is in the initial or boost phase position.

**4,109,868**

## FUEL SUPPLY GOVERNING DEVICE

**Haas Stenlund, Mölndal, Sweden, assignor to Gotaverken Angteknik AB, Gothenburg, Sweden**

**Filed Jan. 6, 1977, Ser. No. 757,327**
**Claims priority, application Sweden, Feb. 3, 1976, 7601106**
**Int. Cl.² B05B 7/04**
**U.S. Cl. 239—413** **1 Claim**




1. In a device for governing the supply of liquid fuel to a spray nozzle while maintaining an atomizing pressure at a predetermined level;

(A) means for supplying said liquid fuel at a substantially constant pressure,

(B) a first conduit for connecting said supply means with the spray nozzle,

(C) a throttle valve in said conduit and first means to operate said throttle valve,

(D) a source of pressurized gaseous fluid,

(E) a jet nozzle fitted in said first conduit,

(F) a second conduit to connect said source of gaseous fluid with said jet nozzle,

(G) governing means in said second conduit for metering the supply of said gaseous fluid, and

(H) further means for monitoring the pressure in said first conduit, downstream of said throttle valve but upstream of said jet nozzle, and to maintain the combined pressures of said fuel and said gaseous fluid at said predetermined level by actuating the operating means at said throttle valve

(I) whereby the pressure of said fuel is affected responsive to the pressure of said gaseous fluid to thereby actuate said monitoring means which consequently causes said throttle valve to adjust the amount of fuel delivered to said nozzle resulting in constant pressure at the same.

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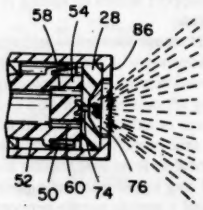
**4,109,869**

## OILER WITH ADJUSTABLE SPRAY NOZZLE

**Norman D. Brockelsby, Grand Island, and Reinhold A. Haase, Hastings, both of Nebr., assignors to Dutton-Lainson Company, Hastings, Nebr.**

**Filed Jun. 16, 1977, Ser. No. 807,255**
**Int. Cl.² B05B 1/12**
**U.S. Cl. 239—491** **1 Claim**




1. An improved oiler comprising, in combination:

an oil can;

a removable top;

a substantially uniform diameter tube leading from inside the can and terminating in a spout outside the can, said tube having a pump mechanism incorporated at the end of the tube inside the can, said tube being mounted in the top;

a pump handle also mounted on the top and connected by a linkage to the pump for driving the pump in response to actuation of the handle; and

a variable spray nozzle attached to the outside end of the spout, said nozzle including

an annular cylindrical mounting member threaded internally for attachment to the end of the spout and threaded externally at the outer end for receipt of a compression fitting, the internal passage of said outer end being frustoconically shaped and diverging outwardly,

a cylindrical channel member fabricated from an elastic material, said channel member including a central passage extending partially therethrough from an inside end toward an outside end, the inside end being complementary with the frustoconical portion of the mounting member and press fit therein, the outside end including an integrally molded passage block having an outside flat surface, first and second small diameter openings therethrough, each opening being spaced from the centerline axis of the passage, each opening being connected by a separate channel in the end flat face of the block, said channels intersecting at the centerline axis of the passage to define a depression with a center hub therein, said center hub terminating beneath the plane of the flat face surface, the outside surface including an integral circumferential lip seal projecting therefrom;

a cylindrical disc having a center passage of an area substantially less than the area of the channel member openings, said center passage at the centerline axis of the channel member opposed to the depression and center hub, said disc having a flat inside surface in opposed relation to the flat face of the channel member; and

a compression fitting comprising an open ended cylindrical cup with the sealing flange of the channel member engaging the inside surface of the compression fitting, said cylindrical cup threadably attached to the mounting member and including a passage through the bottom of the cup defining an annular flange for retaining the disc and relatively positioning the disc and channel member surface in spaced relation, whereby the compression fitting may be adjusted to adjust the spacing of the disc face relative to the channel member face and thereby provide an adjustable spray pattern, said pattern being a fine line when said face and surface are spaced becoming a mist pattern upon approach and contact of the face and surface in response to the effective increase of the angular momentum of fluid through the channels and depression of the channel member.

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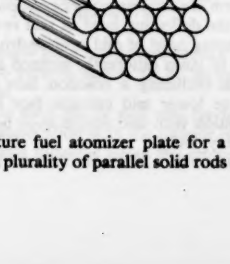
**4,109,870**

## MULTIORIFICE STRUCTURE AND METHOD OF MAKING SAME

**William George Wolber, Southfield, Mich., assignor to The Bendix Corporation, Southfield, Mich.**

**Filed Apr. 29, 1977, Ser. No. 792,426**
**Int. Cl.² B05B 1/14**
**U.S. Cl. 239—558** **12 Claims**




1. A multi aperture fuel atomizer plate for a fuel injector valve comprising a plurality of parallel solid rods disposed in a

predetermined geometrical pattern wherein each rod is fused to each adjacent rod and the interstices formed between the fused adjacent rods form a plurality of orifices, said multiorifice structure having a first surface and a second surface and said plurality of orifices pass through said structure from said first surface to said second surface and wherein said first and second surfaces are separated by a distance small compared to the dimensions of said first and second surfaces.

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**4,109,871**

## METHOD AND APPARATUS FOR PROCESSING ABRASIVE MATERIAL

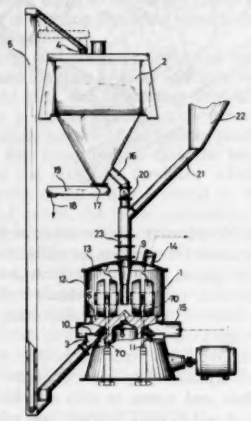
**Ludger Lohnherr, Oelde, Fed. Rep. of Germany, assignor to Polysius AG, Neubeckum, Fed. Rep. of Germany**

**Filed Dec. 20, 1976, Ser. No. 752,139**

**Claims priority, application Fed. Rep. of Germany, Jan. 8, 1976, 2600499**

**Int. Cl.² B02C *23/12***

**U.S. Cl. 241—24** **4 Claims**



1. A continuous method of treating abrasive material comprising feeding the material from a supply to a roller mill, grinding the material in the roller mill, discharging both the fine material and coarse material in a downward direction under the influence of gravity from the roller mill, mechanically lifting all of the material discharged downwardly from the roller mill to an air separator, separating fine material from the coarse material in the air separator, discharging the fine material from the air separator and feeding the coarse material from the air separator back to the roller mill while continuing to feed the material from the supply to the roller mill.

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**4,109,872**

## PULPING APPARATUS FOR LIQUID SLURRY STOCK

**Joseph Walter Couture, Dorval, Canada, assignor to The Black Clawson Company, Middletown, Ohio**

**Filed Jul. 29, 1977, Ser. No. 820,089**

**Int. Cl.² B02C *23/36***

**U.S. Cl. 241—46.11** **10 Claims**

1. A rotor for use in pulping apparatus of the character described for liquid slurry stock including a tub for receiving a quantity of the stock and a perforated annular extraction plate forming a portion of a wall of the tub, comprising:

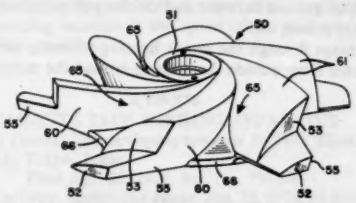
(a) a rotor body adapted to be mounted for rotation on the central axis thereof in predetermined direction in the tub in cooperative centered relation with the extraction plate and including a hub portion and a plurality of composite vanes projecting generally radially from said hub portion in circumferentially spaced relation,

(b) each of said composite vanes including a defibering portion and a pumping portion,

(c) said defibering portion constituting the radially outer end portion of said vane and having substantially smaller axial dimensions than said hub portion,

(d) means forming an essentially plane leading face on each said defibering vane portion extending tangentially of said rotor body in said direction of rotation from a radius to the radially outer end thereof and defining with said radius an angle *a* of substantially less than 45°,

(e) said pumping portion constituting the radially inner portion of each said composite vane but being of substantially lesser radial dimensions and substantially greater axial dimensions than said defibering portion,



(f) means forming a leading face on each said pumping portion of such configuration as viewed axially of said rotor body that the angle *b* defined by a radius and a tangent to the outer end thereof is sufficiently larger than said angle *a* to promote efficient vortical circulation of the stock, and

(g) said leading face on each of said pumping portions being plane in axial section and forwardly inclined into partially overhanging relation with the forwardly adjacent said pumping portion to define therewith a groove in the upper surface of said body.

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**4,109,873**

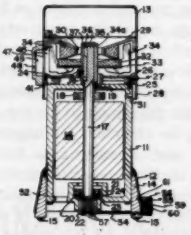
## GRINDING MILL

**William H. Lichfield, P.O. Box 112, Corinne, Utah 84307**

**Filed Jul. 29, 1976, Ser. No. 709,812**

**Int. Cl.² B02C *23/28***

**U.S. Cl. 241—56** **9 Claims**



1. A grinding mill having

a hopper;

a hopper plate in the hopper, said hopper plate having an opening through which grain or the like is fed from the hopper;

a fixed grinding stone beneath the hopper plate and having a downwardly facing grinding surface;

a motor housing;

a motor in said housing;

a motor shaft driven by said motor and extending upwardly therefrom;

a rotating grinding stone having an upwardly facing grinding surface carried by said motor shaft, said grinding surfaces of said fixed and rotating grinding stones being in

face-to-face relationship, with a grinding chamber therebetween;

turbine blades rotatable with said rotating grinding stone;

means including a baffle plate in the hopper and spaced from the hopper plate and a wall projecting downwardly from said baffle plate to direct air from between the motor housing and hopper centrally to the rotating grinding stone for supplying cooling air across the bottom of said rotating grinding stone to said turbine blades at the peripheries of said stones;

means mounting the hopper above the motor housing;

a discharge spout extending tangentially from said hopper beneath the hopper plate to receive said air and entrained flour ground between and discharged peripherally from said stones; and

openings through the motor housing whereby air is circulated from outside the housing around the motor.

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**4,109,874**

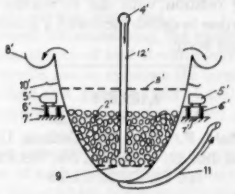
## APPARATUS FOR MINERAL PROCESSING

**Stoycho Mitrev Stoev; Ivan Mitrev Sapunarov, and Emil Nikolov Manov, all of Sofia, Bulgaria, assignors to Vish Minno-Geloshki Institute-Nis Darvenitza, Darvenitza, Bulgaria**

**Continuation-in-part of Ser. No. 572,456, Apr. 28, 1975, abandoned. This application Aug. 18, 1976, Ser. No. 715,635**

**Int. Cl.² B02C *23/36***

**U.S. Cl. 241—69** **2 Claims**



1. In a combined milling, flotation and size classifying apparatus for a graded-size particulate charge, the apparatus including a milling chamber containing a flotation liquid and a particulate milling medium, means for selectively introducing the charge into the chamber, means for selectively introducing air into the chamber below the level of the flotation liquid to form, with small-size particles of the charge released when the chamber is agitated, a froth that floats to the top of the liquid, and means for agitating the chamber; the improvement for more efficiently milling and classifying a brittle-type charge, wherein the milling medium comprises elastomeric bodies, and in which the agitating means comprises means for imparting a rapid vertical vibration to the chamber to uniformly disperse the air introduced therethrough throughout the chamber and to thereby increase the efficiency of the froth-production process, and comprising first outlet means on said milling chamber for removing a froth having floatable component particles of said particulate charge, whereby said vibrating milling chamber causes said elastic milling bodies to mill said particulate material, the floatable particles of said milled charge thereafter being removed from said milling chamber with said froth to which they adhere through said first outlet, a second outlet in the bottom portion of said milling chamber for removing the coarser component particles of said mineral ore from said milling chamber, and a first screen mounted in said working cell below said mass of elastic milling bodies and above said second outlet.

**4,109,875**

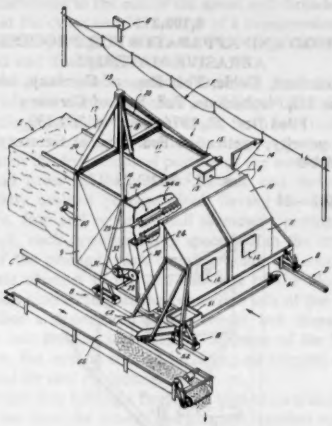
## MODULE FEEDING APPARATUS

**Jose G. Condarco; John E. McClesky; Pedro Condarco, all of Gaines County, Tex., and Charles V. Brown, New York, N.Y., assignors to Continental Conveyor and Equipment Company, Sherman, Tex.**

**Filed Jun. 21, 1976, Ser. No. 697,938**

**Int. Cl.² B02C *13/286***

**U.S. Cl. 241—101.7** **5 Claims**



1. Apparatus for releasing fibrous material from modules, bales, or the like thereof comprising movably mounted framing with transversely spaced transport elements, a top member, a plurality of powered, rotary fiber release bodies depending below said top member, means for transporting the apparatus against and through a module in its path to cause said bodies to progressively remove fibers from said module, a module back-up member normally carried by said top member in position to clear said module, and means to shift said back-up member against the end of said module opposite said release bodies, as said bodies approach said end, to support the module remnant.

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**4,109,876**

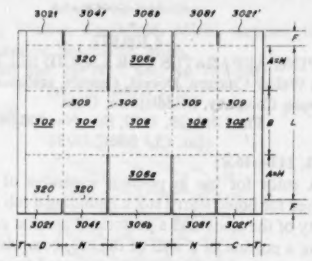
## SUSPENSION MEANS FOR FURNITURE SHIPPING PACKAGE

**John R. Kratochvil, Jr., Newton, N.C., assignor to Boise Cascade Corporation, Boise, Id.**

**Filed Jul. 13, 1976, Ser. No. 704,943**

**Int. Cl.² B65D *85/00***

**U.S. Cl. 206—326** **2 Claims**



1. Carton blank means for shipping articles of furniture having frame and depending leg portions, comprising

(a) a unitary rectangular blank formed of fibrous material and including successive bottom, first side, top and second

side panels foldably connected by parallel first fold lines, respectively;

(b) the first fold lines between said top and side panels having at their free ends slot means which define top flaps foldably connected with said top panel for hinged movement about second fold lines normal to said first fold lines, said side and bottom panels being foldable about said first fold lines to define a hollow tube of rectangular cross-sectional configuration in which the free edges of a pair of said panels are adjacent each other when folded;

(c) means for securing together said free adjacent panel edges, said top flaps being foldable downwardly about said second fold lines toward vertical positions between and normal to said bottom and side panels, respectively, whereby said top panel and top flaps define an erected carton for supporting the article of furniture with the frame portion thereof seated on the top panel and with the leg portions thereof extending in pairs downwardly on opposite sides of the top flaps between said side panels;

(d) the height of each top flap when in the folded vertical position being equal to the height (H) of the side panels, the length of each top flap being equal to the width (W) of the bottom panel

(e) supporting tabs foldably connected with the bottom edges of said top flaps by third fold lines parallel with said second fold lines, said supporting flaps being foldable to horizontal positions in contiguous secured engagement with the upper surface of the bottom panel, the height of each top flap being greater than the length of the leg portion of the article of furniture, whereby when the frame portion of the article is seated on the top panel of the erected carton, the lower extremities of the leg portions are spaced from the bottom panel; and

(f) end tabs foldably connected with the remaining pairs of opposite edges of said bottom panel and said first and second side wall panels, respectively, by fourth fold lines normal to said first fold lines, respectively, said end tabs being foldable inwardly toward positions normal to their respective panels, the bottom panel end tabs to be secured at opposite ends with the associated side wall end tabs, respectively.

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**4,109,877**

## WINDING APPARATUS

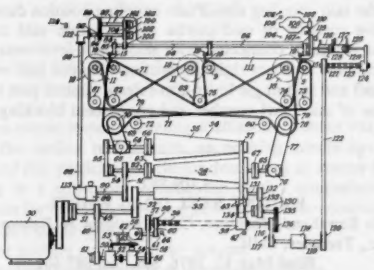
**Stephen William Yates, Bolton, England, assignor to Platt Saco Lowell, Helmshore Rossendale, England**

**Filed Apr. 1, 1977, Ser. No. 783,949**

**Claims priority, application United Kingdom, Apr. 7, 1976, 14050/76**

**Int. Cl.² B65H *75/16***

**U.S. Cl. 242—54.4** **9 Claims**



1. Apparatus for winding an elongate fibrous material, comprising, package tube mounting means to support first and second package tubes in winding positions, a material delivery means for delivering material first to one of the package tubes to form a first package and then to the other of the package tubes to form a second package, and variable speed drive means for rotating the package tubes, said variable speed drive means comprising a first output drive member for driving one of the package tubes, a second output drive member for driving the other of the package tubes, a constant speed input member, a drive transfer mechanism for transmitting drive from said input member to the output drive members throughout a predetermined range of complementary drive ratios and control means responsive to a predetermined control input progressively to adjust the drive transfer mechanism to vary the complementary drive ratios in said range to produce a gradual reduction in speed of one of the two output drive members with a corresponding increase in the speed of the other output drive member followed by a gradual reduction in speed of the said other of the two output drive members with a corresponding increase in the speed of the said one of the output drive members.

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**4,109,878**

## CASSETTE TAPE WINDING APPARATUS

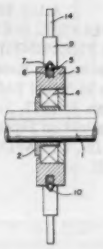
**Masayuki Osawa, Tokyo, Japan, assignor to TDK Electronics Co., Ltd., Tokyo, Japan**

**Filed Apr. 26, 1977, Ser. No. 790,936**

**Claims priority, application Japan, Jun. 22, 1976, 51-82040[U]**

**Int. Cl.² B65H *17/02***

**U.S. Cl. 242—68.3** **8 Claims**



1. A cassette tape winding apparatus which comprises:

an annular wheel, for mounting said tape, having an annular groove provided therein on an inner circular surface of said annular wheel;

a rotary shaft having a circular groove provided therein;

an elastic member disposed within said circular groove; and

a spring member mounted on said elastic member such that the upper half portion of said spring member projects outside of said circular groove and wherein said annular groove firmly engages said upper half portion of said spring member with said annular groove so as to prevent axial displacement of said annular wheel with respect to said rotary shaft.

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**4,109,879**

## METHOD AND APPARATUS FOR COLLECTING WIRE ROD OR THE LIKE AT THE OUTLET OF A ROLLING MILL

**Giulio Properzi, Via Pietro Cossa, 1, Milano, Italy**

**Filed Mar. 25, 1977, Ser. No. 781,384**

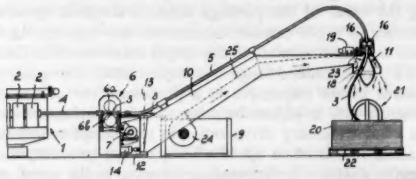
**Claims priority, application Italy, Mar. 26, 1976, 21611 A/76**

**Int. Cl.² B21C *47/00***

**U.S. Cl. 242—82** **3 Claims**

1. A method of collecting wire rod and the like at the outlet of a rolling mill, wherein the wire rod is deposited in substantially horizontal coils by means of a rotating guide, said rotating guide being rotated at a rotational speed controllably variable between two limit values, such as to obtain continuously concentrical coils having continuously and alternately increasing and decreasing radii variable between a maximum limit value and a minimum limit value, said rotational speed of said

rotating guide being controlled to vary between said two limit values according to the law



$$N(t) = \frac{V \cdot 60}{2} \cdot \frac{1}{\sqrt{R_E^2 - \frac{\phi V t}{\pi \epsilon}}}$$

periodically repeating, where N is the rotational speed in rpm of said rotating guide, V is the linear velocity of delivery of the wire rod from said rolling mill, $R_E$ is the maximum outside radius of the formed coils, $\phi$ is the diameter of the wire rod, $t$ is the generic time, $\epsilon$ is the filling factor of the coil arrangement.

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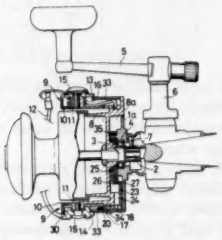
**4,109,880**

## SPINNING REEL HAVING OVERRIDEABLE FRICTION BRAKE FOR PREVENTING BAIL RELEASE

**Tatuya Yamasaki, Fuchu, and Kounin Sazaki, Fukuyama, both of Japan, assignors to Ryobi Ltd., Fuchu, Japan**

**Filed Jun. 6, 1977, Ser. No. 803,921**
**Claims priority, application Japan, Jun. 11, 1976, 51-76510[U]**
**Int. Cl.² A01K *89/01***
**U.S. Cl. 242—84.21 R** **4 Claims**



1. In a spinning reel including a bail arm **12** pivotally mounted at both ends on diametrically opposite sides of a rotor **8** for swinging movement thereacross between a cocked and a rewind position, a torsion spring **16** biasing the bail arm toward the rewind position, an L-shaped kick lever **19**, a C-shaped pivot cam **14** mounted on one end of the bail arm, the kick lever and the pivot cam being slidably and pivotally mounted, respectively, on a support housing **9** of the rotor, a spring **20** biasing the kick lever toward the pivot cam and into engagement therewith, and a key plate **25** mounted to a reel body **1** and having a trip tab **26** disposed in the rotational path of a projection **39** on the kick lever when the bail arm is cocked, the kick lever locking the pivot cam and bail arm in the cocked position, and adapted to be cammed toward the reel body to a retracted position, following rotation of the rotor, to thereby release the bail arm and pivot cam; the improvement characterized by:

brake means disposed in the path of travel of the kick lever projection when the bail arm is cocked for frictionally engaging said projection before it reaches the trip tab to thereby arrest the rotation of the rotor and prevent the premature and inadvertent release of the cocked bail arm.

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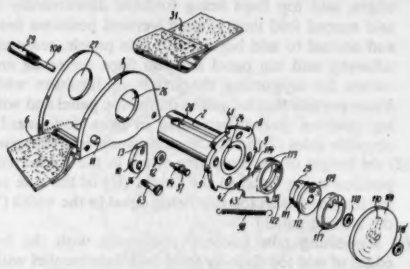
**4,109,881**

## WINDING-UP DEVICE WITH AUTOMATIC LOCK INITIATED BY FRICTION FOR A SAFETY BELT

**Artur Föhl, Schelmenwasenstrasse 68, 7061-Haubersbronn, Fed. Rep. of Germany**

**Division of Ser. No. 343,887, Mar. 22, 1973, Pat. No. 3,921,930.**
**This application Apr. 21, 1975, Ser. No. 570,199**
**Claims priority, application Fed. Rep. of Germany, Mar. 24, 1972, 2214307; Jun. 19, 1972, 2229662; Aug. 23, 1972, 2241357**
**Int. Cl.² A62B *35/02*; B65H *75/48***
**U.S. Cl. 242—107.4 A** **12 Claims**



1. In combination with a winding-up device for a vehicle safety belt including a pawl member, a housing pivotally journalling said pawl member, an inertia disc separate from the pawl member and a winding-up shaft normally freely rotatable in the housing in both pay-out and take up directions and adapted for connection to one end of a safety belt said winding-up shaft having means thereon engageable with said pawl member for blocking rotation of said shaft, said pawl member being moveable between disengaged and engaged blocking positions with said shaft, spring means engaging said pawl member to bias said pawl member toward its blocking position, the inertia disc being journalled rotatably though axially unshiftable upon the shaft, a return spring biasing said shaft in take up direction said inertia disc rotating relative to said shaft in one direction when said shaft is accelerated in a belt pay-out direction, a braking member responsive to vehicle acceleration and movable out of rest position thereof to effect braking of the inertia disc a coupling means controlled by the inertia disc during said relative rotation with respect to the shaft, a single-lever-arm-release control part securely coupled with the shaft by said coupling means, said single-lever-arm-release control part normally holding said pawl member in disengaged position, said coupling means having a rest position wherein said coupling means is free of connection with said single-lever-arm-release control part, and a control cam means connected with said inertia disc, said control cam means functioning to transfer said coupling means into coupling position during said relative rotation of said inertia disc wherein said coupling means is rigidly connected with said single-lever-arm-release control part to effect rigid connection between said winding-up shaft and said single-lever-arm-release control part to effect release of said pawl member and consequent blocking of said shaft.

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**4,109,882**

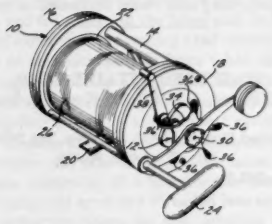
## FISHING REEL DRAG WHEEL

**Kunio Kawakami, Torrance, Calif., assignor to Kencor Sports, Inc., Torrance, Calif.**

**Filed May 17, 1976, Ser. No. 687,401**
**Int. Cl.² A01K *89/02***
**U.S. Cl. 242—217** **1 Claim**

1. In a fishing reel having a spool, gear means coupled to said spool and rotatable to rotate said spool, a shaft, a handle mounted to said shaft for rotation of said shaft, and clutch means operative to frictionally couple said gear means and said shaft for rotation of said spool by said handle, the improvement comprising:

a drag wheel formed of flat metal plate and including a flat hub portion rotatable upon said shaft for engagement with and operation of said clutch means to adjust the frictional resistance of said spool to rotation by said handle, said drag wheel further including a plurality of spokes radiating outwardly of said hub portion and terminating in



enlarged tap portions having opposite flat faces, said spokes being twisted through approximately 90° relative to said hub portion and thereby disposing said tab portions in approximately right angular relation to the plane of said flat hub portions whereby only said opposite flat faces are normally engaged by the fisherman in rotating said drag wheel in opposite directions.

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**4,109,883**

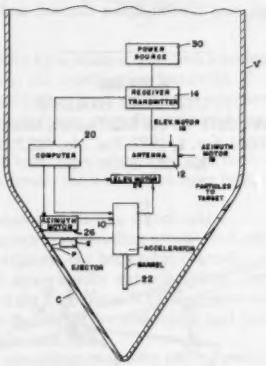
## ANTI-MISSILE MISSILE

**Abraham L. Korr, and David B. Rosenblatt, both of Philadelphia, Pa., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Mar. 29, 1965, Ser. No. 444,515**

**Int. Cl.² F41G *9/00***

**U.S. Cl. 244—3.1** **3 Claims**




1. In a carrier system traveling at altitudes of about 100 miles above the surface of the earth, an orbiting missile having a charge of fine particles therein for destroying an enemy target moving in a trajectory outside the earth's atmosphere, an apparatus for directing said charge into a collision course with said target; comprising:

a nose portion on said carrier system,

means for ejecting said nose at certain altitudes,

means for electrically charging particles prior to acceleration,

said particles consisting essentially

of gamma aluminum oxide having a size ranging between about $10^{-2}$ to $10^{-7}$ cm in diameter,

an accelerator within said carrier system for propelling said particles therefrom at hypervelocities,

means for detecting said target above the earth's atmosphere, and

means for compensatingly directing said accelerator to propel said particles at said moving target.

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**4,109,884**

## APPARATUS AND METHOD FOR STORING PRESSURE GAS IN A RESERVOIR OF A PROJECTILE

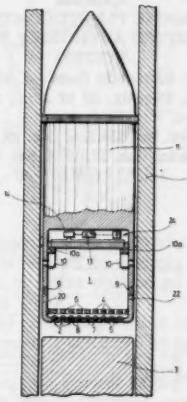
**Walter Kranz, Taufkirchen, and Lynn Hohnecker, Munich, both of Fed. Rep. of Germany, assignors to Messerschmitt-Bölkow-Blohm GmbH, Fed. Rep. of Germany**

**Filed Feb. 2, 1977, Ser. No. 764,801**

**Claims priority, application Fed. Rep. of Germany, Feb. 12, 1976, 2605428**

**Int. Cl.² F42B *15/18***

**U.S. Cl. 244—3.22** **3 Claims**



1. A pressure gas reservoir for supplying pressure gas to control mechanisms of a projectile to be discharged from a gun tube by means of a propellant charge, comprising a projectile body having wall means defining a reservoir within said projectile body with a wall portion adapted to be exposed to the pressure gases of the propellant charge, check valve means in said wall portion permitting inflow of pressure gas into said reservoir during firing for the storage of the gases in the reservoir for use in operating the control mechanism, said wall portion comprising a bottom having an inner wall and an outer wall spaced from said inner wall, said inner and outer walls being substantially parallel and each wall having a plurality of apertures which are offset in respect to the apertures of the other wall, said check valve means comprising a closing body disposed in each of said apertures of the outer one of said walls of a size to be movable between said walls to open the apertures but having a diameter which is larger than the spacing between the walls, a control nozzle mounted on said wall means, and a pressure operated control device connected to said control nozzle for opening and closing said control nozzle.

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**4,109,885**

## VERTICAL TAKE-OFF AND LANDING AIRCRAFT

**David R. Pender, 1018 Marion St., Columbia, S.C. 29201**

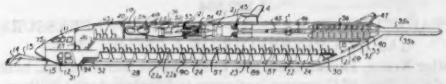
**Filed Oct. 21, 1976, Ser. No. 735,130**

**Int. Cl.² B64C *27/30, 27/50***

**U.S. Cl. 244—7 R** **8 Claims**

1. In an airplane with a retractable rotor system, a pressure jet rotor, a stowage tube for the rotor in the fuselage of the airplane into which the rotor can be retracted and from which it can be deployed, the rotor stowage tube opening through the rear of the airplane fuselage and extending longitudinally forwardly in the fuselage for a major portion of its length, means forming lateral suction slots around the mouth of said stowage

tube and operable during fixed wing flight to maintain laminar flow in the area where the rotor blades extend rearwardly of and outside of said stowage tube, said jet rotor having rotor blade nozzles which substantially plug and seal the mouth of



the stowage tube when the rotor is retracted therein, and rotor blade end portions then projecting in folded opposed relationship longitudinally rearwardly of and outside of said rotor stowage tube.

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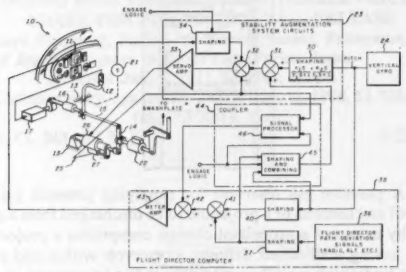
**4,109,886**

## SEMI-AUTOMATIC FLIGHT CONTROL SYSTEM UTILIZING LIMITED AUTHORITY STABILIZATION SYSTEM

**Everett R. Tribken, Scottsdale; Ronald J. Miller, Glendale, and Carl D. Griffith, Phoenix, all of Ariz., assignors to Sperry Rand Corporation, New York, N.Y.**

**Continuation of Ser. No. 534,326, Dec. 19, 1974, abandoned. This application Jan. 12, 1976, Ser. No. 648,238**
**Int. Cl.[2] G05D *1/10***
**U.S. Cl. 244—178** **10 Claims**



1. A flight control system for aircraft having an attitude controlling element for controlling the attitude of said craft about an axis thereof and a manual controller for controlling said attitude controlling element, comprising

a stability augmentation system having sensor means for sensing short term attitude changes of said craft about said axis and providing short term stabilization signals in response thereto and actuator means coupled to said attitude controlling element and responsive to said short term stabilization signals for suppressing said short term attitude changes, said actuator means having a limited displacement capacity from a reference position and tending to reach the limit of said displacement capacity in response to long term reference signals,

position sensing means coupled to said actuator means for providing an actuator position signal representative of the position of said actuator with respect to said reference position,

reference means for providing a long term reference signal,

first coupling means for coupling said long term reference signal to said stability augmentation system for providing corresponding long term control of said craft through said limited displacement capacity actuator means,

indicator means coupled to said position sensing means for displaying a visual command to the pilot in response to said actuator position signal to manipulate said manual controller to return said actuator means to said reference position when said actuator means approaches the limit of its displacement capacity in its response to said long term reference signal, and

second coupling means coupling said position sensing means to said indicator means for providing a trim demand signal to said indicator means in response to said actuator position signal when said position signal exceeds a threshold representative of an actuator position near said limit of said displacement capacity and after said threshold has been exceeded a trim demand signal that diminishes toward zero as said manual controller is manipulated to return said actuator means to said reference position, thereby providing said visual command to said pilot.

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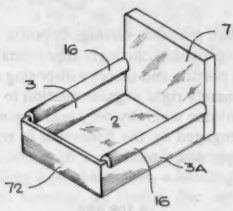
**4,109,887**

## WATERBED RETAINER CAP

**William E. Wakeland, Jr., 1606 W. Flora St., Stockton, Calif. 95203**

**Filed Dec. 16, 1976, Ser. No. 751,540**
**Int. Cl.[2] A47B *96/00***
**U.S. Cl. 248—345.1** **18 Claims**



1. A railcap for a waterbed frame rail comprising an inverted generally U-shaped piece foam member having both a central passage at the open end thereof to receive a waterbed frame rail of similar configuration therein, and of a size slightly larger than said rail, and a pressure inhibiting member selected from the group consisting of retainer receiving means, a drape secured at least to one wall of the inside of said cap defining said central passage, and combinations thereof, and an engaging insert.

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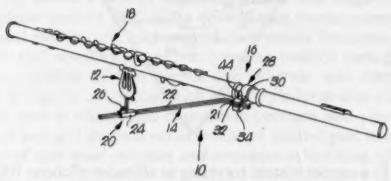
**4,109,888**

## FLUTE LYRE HOLDER

**James D. Hayes, 2011 W. 6th St., Topeka, Kans. 66606**

**Filed Apr. 1, 1977, Ser. No. 783,710**
**Int. Cl.[2] E01B *7/02***
**U.S. Cl. 248—443** **2 Claims**



1. A flute lyre holder assembly, comprising:

a lyre for holding a sheet of music or the like;

an elongated support rod having at least a portion thereof presenting, in cross section, at least one planar outer surface;

coupling means connecting said lyre to said rod; and

structure for connecting said rod to said flute for preventing undesired axial rotation and axial shifting of the rod in order to continuously maintain said lyre and sheet of music in a disposition facilitating reading of the latter by a flute player,

said connecting structure including

a unitary, resilient, ring-like element for substantially

completely circumscribing and gripping said flute intermediate the ends thereof,

a pair of outwardly projecting arms extending from the proximal ends of said element, there being means defining respective, axially aligned bores through said arms, one of said bores being threaded;

means defining a transversely extending opening in at least one of said arms which is complemental with at least a part of the cross sectional shape of said portion of said support rod for receiving the latter and, in cooperation with said other arm, preventing axial rotation of the rod relative to said element and arms when the latter are drawn together and in engagement with the rod; and

releasable securing means for simultaneously drawing said arms together to clamp said element about said flute, and for causing said arms to grip said rod and prevent axial rotation and axial shifting of the latter, said securing means consisting of a thumbscrew located within and bridging said arms and threaded into said one bore, said thumbscrew being the sole securing means provided with said assembly.

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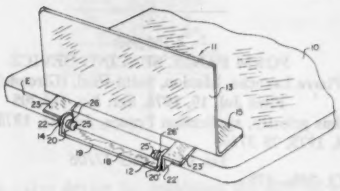
**4,109,889**

## BOOK HOLDER FOR STUDENT'S DESK

**Michael P. Durket, 20701 Leonard Rd., Saratoga, Calif. 95070**

**Filed Apr. 27, 1977, Ser. No. 791,311**
**Int. Cl.² A47B *97/04***
**U.S. Cl. 248—447** **4 Claims**



1. A book holder for a student type desk forming one arm of a classroom chair, the combination therewith of:

(1) a back support for a book and having a forwardly extending ledge at its lower edge for supporting an open book thereon;

(2) a flat plate base disposed beneath said back support and extending laterally the width of an open book on the ledge thereof;

(3) said flat plate base having a back edge;

(4) a pair of upwardly extending ears at each end of said flat plate base adjacent the back edge thereof;

(5) a pair of downwardly extending ears secured to the underside of the ledge on said back support and extending rearwardly therefrom for embracing said pair of ears on said flat plate base; and

(6) means for pivotally connecting each of said downwardly extending ears on said ledge of the back support to a respective one of the upstanding ears on said base flat plate base for hingedly mounting said ledge and back support thereto.

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**4,109,890**

## TELEPHONE SUPPORTED DIRECTORY INFORMATION SUPPORT RACK

**Elford Barnett Breitbard, San Diego, Calif., assignor to Tele-Quik, Inc., San Diego, Calif.**

**Continuation of Ser. No. 677,373, Apr. 15, 1977, abandoned. This application Mar. 30, 1977, Ser. No. 783,020**
**Int. Cl.² A47B *19/00***
**U.S. Cl. 248—452** **4 Claims**

1. A telephone supported directory information support rack comprising:

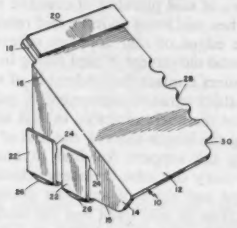
a first planar member for supporting telephone directory information,

a second planar member joined at one of its side edges to one of the side edges of said first planar member,

the opposite side edge of said second planar member having an acute angle with the line of intersection of the intersecting side edges of said first and second planar members,

said second planar member being at a normal angle with said first planar member,

said opposite side edge of said second planar member having securing means for securing said planar members to the side of the telephone with said opposite side edge being substantially horizontal and said first plate member presenting a flat, upwardly inclined surface for presenting directory information to telephone users,



retainer means positioned at the upper inclined end portion of said first planar member for retaining telephone directory information in visible position on said first planar member,

said securing means comprising at least one upwardly directed leg member that is secured to said opposite side edge,

the upper end of said leg member having an enlarged end portion inwardly directed toward said second planar member,

a second spaced upwardly directed leg member that is connected to said opposite side edge and which second leg member has an inwardly directed end portion,

and a U-shaped clasp member with one side portion being projected between said upwardly directed leg portions and said second planar member and the other side portion having an enlarged edge portion.

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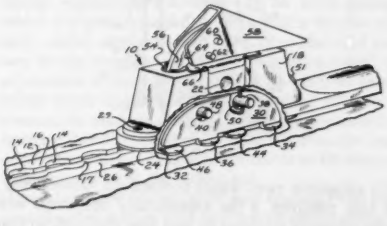
**4,109,891**

## LOAD DISTRIBUTING TRACK FITTING

**Bernard E. Grendahl, Litchfield, Conn., assignor to UOP Inc., Des Plaines, Ill.**

**Continuation-in-part of Ser. No. 706,641, Jul. 19, 1976, Pat. No. 4,047,689. This application Apr. 1, 1977, Ser. No. 783,922**
**The portion of the term of this patent subsequent to Sep. 13, 1994, has been disclaimed.**
**Int. Cl.² B60N *1/00***
**U.S. Cl. 248—503.1** **9 Claims**



1. A track fitting for use with a slotted floor track of the type

used in aircraft wherein said track has a bottom portion, vertical side portions, and top portions carried by each of said side portions and defining the side edges of a longitudinal slot which overlies the bottom and is spaced therefrom, so as to define an open channel, said top portions on each side of said slot being formed so as to define a plurality of alternately spaced retaining lip portions and concave relieved portions said track fitting comprising an elongated housing having a length at least as great as the axial distance between four of said spaced retaining lip portions, aperture means in an upper portion of said housing for anchoring a load to said fitting, a plurality of lobe members mounted within said housing, said lobe members being shaped so as to be capable of being dropped vertically through a plurality of said concave relieved portions in said track and then moved axially with said housing along the track to bring said lobe members under the retaining lip portions, a pair of spring loaded shear pins mounted in said housing, said shear pins being capable of being moved downwardly into two of said plurality of concave relieved portions in said track when said lobes underlie said retaining lip portions to contact the edges of said concave relieved portions and restrict horizontal movement of said fitting in said track while said lobe members contact the underside of said retaining lip portions to restrict upward movement, a pair of horizontal, transverse pivot members mounted in said housing at spaced locations along the length thereof, the first of said pivot members providing the support for first pivoted support plate means which carry the lobe members which are adapted to engage the first and third of any four consecutively axially spaced lip portions in said track and the second of said pivot members providing the support for second pivoted support plate means which carry the lobe members which are adapted to engage the second and fourth of said four consecutively axially spaced lip portions in said track, and adjustment means for pivoting one of said support plate means to cause one of the lobe members thereon to bind against the underside of a retaining lip portion on the track and prevent relative movement between the fitting and track except under high loading conditions.

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**4,109,892**

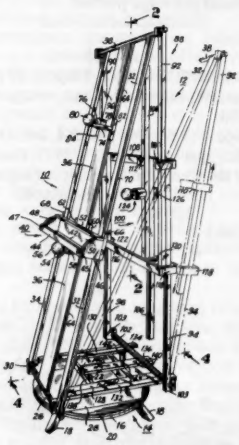
## ADJUSTABLE EASEL

**John P. Hartung, 1557 Merry Ave., Bronx, N.Y. 10461**

**Filed Jun. 30, 1977, Ser. No. 811,726**

**Int. Cl.[2] A47B *97/04***

**U.S. Cl. 248—449** **14 Claims**



1. An adjustable easel which comprises a substantially horizontal base platform, a flat substantially horizontal movable platform pivotally mounted on said base platform, so that said movable platform may be at least partially rotated relative to said base platform, a first substantially horizontal rod, means mounting said first rod on said movable platform, so that said first rod may be partially rotated about its central longitudinal axis, first and second opposed inclined linear frame members, said first and second frame members being substantially parallel, the lower end of each of said first and second frame members being mounted on said first rod adjacent to an end of said first rod, an inclined linear support member, said support member being substantially centrally disposed between and parallel to said first and second frame members, the lower end of said support member being mounted substantially centrally on said first rod, a second substantially horizontal rod, the upper ends of said first and second frame members and said support member being attached to said second rod, substantially horizontal means to support the lower edge of a substantially flat object, said support means being slidably mounted on said support member by attachment means, said attachment means being adjustable so that said support means may be slid along said support member to a desired position and thereafter maintained in the desired position by manipulation of said attachment means, third and fourth opposed inclined linear frame members, said third and fourth frame members being substantially parallel, each of said third and fourth frame members pivotally depending from adjacent an end of said second rod, a third substantially horizontal rod, said third rod extending between and being pivotally attached to the lower ends of said third and fourth frame members, said third rod being mounted on said means mounting said first rod on said movable platform, and integral means to adjust the inclination of said first and second frame members and said support member.

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**4,109,893**

## FORM PANEL SPACING DEVICE

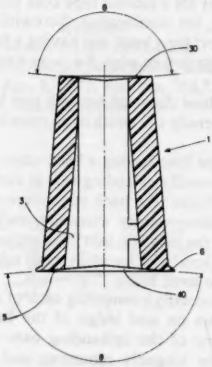
**Jean Pierre Laroche, Mazion, Saint-Paul, (Gironde), France**

**Filed Jul. 19, 1976, Ser. No. 706,205**

**Claims priority, application France, Jul. 22, 1975, 75 22883; Dec. 4, 1975, 75 37168**

**Int. Cl.[2] E04G *17/06***

**U.S. Cl. 249—175** **4 Claims**



1. A spacing device to be held in position between two form panels by a conventional tightening rod extending between the panels for ensuring the proper spacing of the form panels during the pouring and curing of concrete walls comprising a body member in the shape of a frustum of a cone having a larger base and a smaller base, said body member having an outwardly extending flange around the larger base and a bore extending through the center of the body member with the bore opening into the centers of the bases and sized to fit closely around a tightening rod when the tightening rod is inserted therethrough, said larger and smaller bases spaced apart by a distance equal to the desired thickness of concrete

walls to be poured and said body member having an outer wall provided with inwardly directed longitudinal ribs with at least two continuous longitudinal ribs which create said bore to permit the centering of the device on a tightening rod during the installation thereof between the panels and wherein at least one rib is interrupted to permit the engagement of an extracting tool thereby providing a strong spacing device which accurately spaces the form panels, remains properly aligned with the form panels and the tightening rod during installation and is easily removed from one side of the wall after the form panels have been removed.

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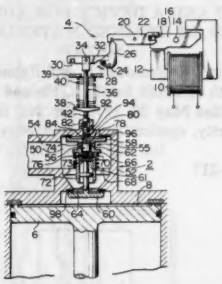
**4,109,894**

## PILOT VALVE DEVICE FOR REGULATING THE FLOW OF A FLUID

**Haruo Honda, and Hiroshi Itoh, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan**

**Filed Jun. 4, 1976, Ser. No. 692,637**
**Claims priority, application Japan, Jun. 18, 1975, 50-73865**
**Int. Cl.[2] F16K *31/143***
**U.S. Cl. 251—30** **8 Claims**



1. A pilot valve device for regulating the flow of a fluid adapted to be brought to an open position in response to a mechanical signal and to cause the fluid to actuate an operating valve, comprising a housing defining a pilot valve chamber, a main valve located in said housing and formed therein with a daughter valve chamber, and a daughter valve located in said daughter valve chamber in said main valve, and arranged substantially coaxially therewith, wherein said daughter valve is brought to an open position in response to the mechanical signal and causes a compressed fluid to act on said main valve to bring the same to an open position whereby the compressed fluid can be made to act on the operating valve, further comprising a push rod slidably fitted in an orifice formed in a top wall of said housing, said mechanical signal being applied to said daughter valve through said push rod, further comprising a first spring supported by an internal support plate formed integrally with said housing to urge said main valve by its biasing force to move to a closed position, a second spring mounted in said daughter valve chamber in said main valve to urge the daughter valve by its biasing force to move to a closed position, and a guide affixed to said support plate for slidably supporting said main valve, wherein said main valve comprises an upper valve seat, a lower valve seat and a daughter valve housing interposed between said upper and lower valve seats, said upper valve seat and the top wall of said housing defining therebetween, when said main valve and said daughter valve are both in the closed position, a main valve actuating chamber which is not in communication with said pilot valve chamber, said lower valve seat performing a valving action when said main valve is in the closed position to block communication between said pilot valve chamber and an operating valve actuating chamber, said daughter valve being brought to an open position when said mechanical signal is applied thereto through said push rod to open communication between the pilot valve chamber and said main valve actuating chamber, whereby the upper valve seat is moved downwardly to thereby move the lower valve seat downwardly so as to bring the main valve to an open position.

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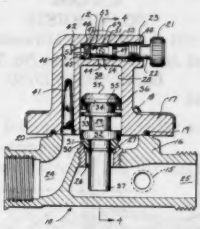
**4,109,895**

## REMOTE ACTUATED METERING VALVE

**William A. Smart, Jr., Pewaukee, and Scott H. Gumm, West Bend, both of Wis., assignors to Bradley Corporation, Menomonee Falls, Wis.**

**Filed Nov. 3, 1976, Ser. No. 738,597**
**Int. Cl.[2] F16K *31/383***
**U.S. Cl. 251—41** **1 Claim**



1. In a remote actuated timed metering valve system for controlling the flow of water which valve system includes a main metering valve, and a remote actuated, normally closed, relief valve connected to the main valve by flexible tubing, the improved main valve which includes a lower body portion having an inlet and an outlet connected by a port surrounded by a valve seat; a cover portion secured to the lower body portion, said cover portion including a piston receiving cavity, a movable piston positioned in said cavity, said piston having a front face adapted to seat on said valve seat and a rear face, a pressure chamber located behind said rear face of the piston which chamber is filled with water when the metering valve is closed; a bypass circuit for the flow of water and the transfer of supply line pressure from the inlet to the pressure chamber where the pressure can be sensed by the rear face of the piston; a timing mechanism located in said bypass circuit and a filter located in said bypass circuit between the inlet and the timing mechanism, in which:

(a) the front face of the piston has an elongated nose which projects below the valve seat even when the valve is open and clearance between the piston nose and the valve seat results in a pressure drop across the seat at normal flow so that a reduced pressure acts on the front face of the piston while substantially full supply line pressure acts upon the rear face of the piston and the sense of the force is to move the piston towards a seated position;

(b) the timing mechanism includes in series in a bore in the bypass circuit an O-ring, a disc-like member of deformable elastomeric material completely contained about its periphery by said bore and aligned with and in contact with said O-ring, said member having an axial opening about 0.01 inches to 0.02 inches in diameter through which water must pass to reach the pressure chamber and a timing adjustment screw having an axial passageway which is aligned with the axial opening in the disc member and a radial passage which leads from the axial passageway to the pressure chamber of the valve, which timing adjustment screw can be adjusted to exert an axially directed force upon the disc-like member to deform the elastomeric material of the disc-like member into the axial opening thereby reducing its effective diameter and thus controlling the time required for water to fill the pressure chamber and close the valve; and

(c) the main valve has an outlet port leading from the pressure chamber and an inlet port which communicates with the outlet of the main valve downstream of the valve seat, whereby the remoted actuated, normally closed, relief

valve may be connected to the outlet port of the main valve by a first length of flexible tubing and to the inlet port by a second length of flexible tubing so that when the normally closed valve is opened the water present in the pressure chamber of the main valve leaves by flowing through the first length of tubing to the remote valve thus relieving the pressure on the rear face of the piston of the main valve permitting the piston to be moved to an opened position by the force of supply line pressure on its front face and the water leaves the relief valve via the second length of tubing and enters the main valve downstream of the valve seat.

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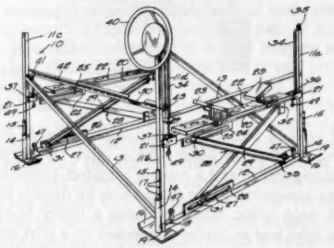
**4,109,896**

## BOAT HOISTS

**Peter D. Ragen, 921 S. 102nd St., Milwaukee, Wis. 53214**

**Filed Jan. 18, 1977, Ser. No. 760,317**
**Int. Cl.² B63C *23/60***
**U.S. Cl. 254—144** **3 Claims**



3. In a boat hoist having a frame provided with longitudinally spaced first and second pairs of uprights and having a horizontal lift beam movably supported adjacent each pair, the improvement comprising a base beam connecting the lower ends of each pair of uprights, each lift beam having a pulley at each end, an upright of the first pair having a winch drum supported near its upper end on a first side of the frame, a first cable deadended to the upper end of the opposite upright of said first pair and then extending downwardly beneath the pulley at one end of the lift beam of said first pair of uprights, along the lift beam and beneath the pulley at the opposite end, and then upwardly to the winch drum; a second cable deadended to the upper end of the other upright on a second side of the frame, extending downwardly beneath the pulley at one end of the lift beam for the second pair of uprights, along the beam and beneath the pulley at the other end of said beam, upwardly along the adjacent upright on said first side of the frame, there being an auxiliary pulley spaced upwardly on said last upright and a corresponding auxiliary pulley on the upright having the winch, and said second cable having a length passing from one of said auxiliary pulleys to the other and then up to said winch drum whereby when the winch is operated both cables will be acted on to move both lift beams simultaneously.

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**4,109,897**

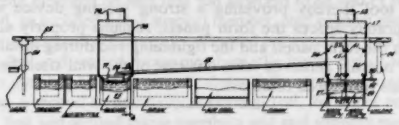
## SALT RECLAMATION SYSTEM

**Quentin D. Mehrkam, Bryn Mawr, Pa., assignor to Ajax Electric Company, Huntingdon Valley, Pa.**

**Filed Apr. 5, 1976, Ser. No. 673,462**
**Int. Cl.² C21D *1/46***
**U.S. Cl. 266—120** **4 Claims**

1. A facility for heat treatment of articles comprising a sequence of molten salt baths including a quenching bath and a draw bath downstream of the quenching bath, means for immersing the articles sequentially in said baths, and means for water washing drag-out salt from the articles after removal from the draw bath, the washing means comprising at least two water washing stages, the first of which is maintained at a salt concentration providing for maintenance of a temperature on the order of about 200° to 300° F.

2. A facility for heat treatment of articles comprising a sequence of molten salt baths including a quenching bath and a draw bath downstream of the quenching bath, means for im-



mersing the articles sequentially in said baths, and means for water washing drag-out salt from the articles after removal from the draw bath, the washing means including a water washing bath and a water spray, and means for preheating the spray water by heat exchange with the water of the washing bath.

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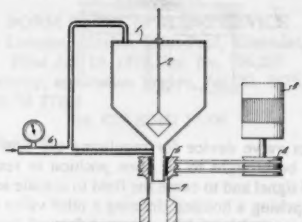
**4,109,898**

## METHOD AND A DEVICE FOR ADDING SOLID, POWDERED OR GRAINED MATERIAL TO MELTED METAL

**Jaakko Lautjärvi, Kuljunniemi B, and Raimo Eriksson, Kuljunniemi A, both of 92160 Saloinen, Finland**

**Filed May 20, 1976, Ser. No. 688,432**
**Claims priority, application Finland, May 21, 1975, 751479**
**Int. Cl.² C21C *7/00***
**U.S. Cl. 266—217** **1 Claim**



1. A device for adding solid, granular or powdered material to melted metal, comprising:

(a) a container for containing material to be added to the melted metal,

(b) a tube having an upper end and a lower portion, the lower portion being formed in diverging conical shape and having means defining an open lower end,

the upper end of the tube being connected to the material container to enable material to flow downwardly through the tube, the tube being adapted for having the lower end portion immersed into melted metal,

(c) gas pressurizing means for pressurizing the tube to a pressure substantially equal to that pressure just preventing flow of melted metal up into the tube when the lower portion is immersed into melted metal,

(d) rotating means for axially rotating the tube at a speed causing material flowed downwardly through the tube to be slung outwardly through the open lower end into the

melted metal in which the lower end is immersed and causing dispersion therein without substantial outflow of gas from the pressurizing means, and

(e) means defining openings in the tube lower portion at the open lower end thereof, whereby slinging action of the rotating tube and dispersion of the material into the melted metal is enhanced.

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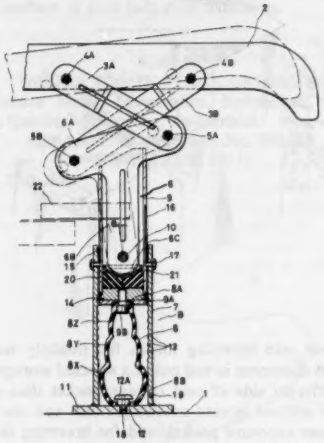
**4,109,899**

## SHOCK ABSORBING DEVICE WITH RESTORING INHIBITING MEANS

**Suehiro Takatsu, 3-21-6,, Marunouchi, Naka-ku, Nagoya-shi, Aichi-ken, Japan**

**Filed Apr. 19, 1977, Ser. No. 788,770**
**Int. Cl.² F16F *1/36***
**U.S. Cl. 267—140** **6 Claims**



1. A shock absorber comprising a pair of crossed links each adapted at one end thereof for attachment to an automobile bumper, an arm fitted to the other end of each link, a plunger pivotally supporting the arm, a closed cylinder movably holding the plunger, one end of the cylinder adapted for attachment to an automobile body, a flexible cushion internally positioned within the cylinder whereby depending on bumper displacement corresponding to the direction of a shock imparted thereto the arm displaces the plunger and such displacement of the plunger into the cylinder causes buckling of the cushion to thereby absorb the shock, and means for inhibiting, but not preventing return movement between the cylinder and the plunger comprising saw-teeth arranged longitudinally along the inside wall of the cylinder and at least one elastic ring on the plunger projecting outwardly therefrom into engaging relationship with the saw-teeth as the plunger and cylinder move relative to one another, each saw-tooth having an inwardly and downwardly sloping upper surface and a lower surface at substantially right angles to the inside wall of the cylinder.

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**4,109,900**

## CHAINSAW VISE

**Kenneth E. Vandecoevering, Rte. 4, Box 189, Hillsboro, Oreg. 97123**

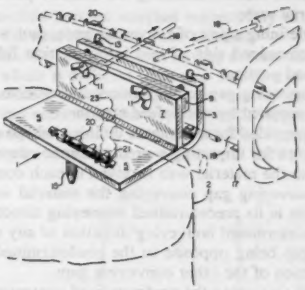
**Filed Sep. 20, 1977, Ser. No. 835,034**
**Int. Cl.² B25B *1/24***
**U.S. Cl. 269—102** **7 Claims**

1. A vise for clamping chainsaw parts comprising:

a frame;

first and second vertical fixed jaws mounted on the frame in spaced apart relation;

plural clamping means on the second fixed jaw; a moveable jaw operatively connected to the first fixed jaw, the moveable jaw positioned at least partly within the space between the fixed jaws and independently moveable against the first jaw to clamp a part;



and a horizontal anvil adjacent the vertical fixed jaws.

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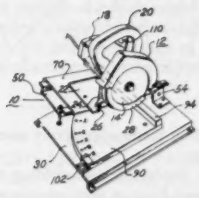
**4,109,901**

## MITER TABLE FOR PORTABLE CIRCULAR SAW

**Paul A. Akin, 25808 County Rd. 6, Elkhart, Ind. 46514**

**Continuation-in-part of Ser. No. 686,253, May 13, 1976, abandoned. This application Jul. 5, 1977, Ser. No. 813,094**
**Int. Cl.² B27B *9/04, 5/20***
**U.S. Cl. 269—290** **9 Claims**



1. A miter table for portable circular saws, comprising a base having a forward and rearward end, an arm pivoted to said base near the rearward end thereof and movable angularly on a vertical plane toward and away from said base, a carriage for supporting the saw on said arm in cutting position and being movable forwardly and rearwardly on said arm, a means for securing the saw rigidly to said carriage, a fence pivotally connected on a fixed vertical axis to said base and movable to various angular positions relative to said arm for holding material while being cut, a platform mounted on said base forwardly of said fence and rigidly attached to said fence for pivotal movement therewith, means disposed near the forward edge of said platform for retaining said fence and said platform in an adjusted position, and an adjustable stop means for determining the lowermost position of said arm with respect to said base.

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**4,109,902**

## APPARATUS FOR THE CONTINUOUS ZIGZAG FOLDING OF A MATERIAL WEB

**Robert Barrer, Muri, Switzerland, assignor to Faltex Handels AG, Hergiswil, Switzerland**

**Filed Apr. 4, 1977, Ser. No. 784,282**
**Claims priority, application Switzerland, Apr. 22, 1976, 5041/76**
**Int. Cl.² B65H *45/20***
**U.S. Cl. 270—79** **8 Claims**

1. An apparatus for the continuous, substantially zigzag-shaped folding of a material web, comprising:

means defining an infeed station for the material web for feeding the material web thereat in a given conveying direction;

said infeed station including an outfeed portion for said material web;

means defining a pair of conveying gaps, each arranged to a predetermined side of said infeed station following said outfeed portion;

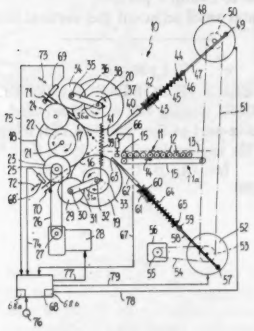
each conveying gap being positioned to receive the material web supplied by said infeed station;

means provided for said means defining said pair of conveying gaps for imparting a predetermined conveying direction to the material web received in each conveying gap;

each conveying gap conveying the material web received therein in its predetermined conveying direction;

the predetermined conveying direction of any one conveying gap being opposite to the predetermined conveying direction of the other conveying gap;

means for reversing the predetermined conveying directions of both conveying gaps relative to one another;



a respective folding blade operatively associated with each conveying gap;

drive means for displacing each folding blade from a rest position removed from its associated conveying gap into a work position adjacent such conveying gap;

said drive means alternately driving each such folding blade through a work stroke into said work position and back again into said rest position at that moment in time when the conveying direction of the associated conveying gap reverses so as to be in synchronism with said given conveying direction of the infeed station;

said means defining said conveying gaps comprises a first roll and two second rolls;

said first roll being paired with each one of said second rolls;

spring means for pre-biasing said second rolls in the direction of said first roll;

said second rolls being raisable from said first roll against the action of said pre-biasing spring means.

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**4,109,903**

## FLUIDIC FEEDING OF DOCUMENTS TO AN EXPOSURE STATION

**Klaus K. Stange, Pittsford; Richard E. Smith, Webster; Thomas J. Hamlin, Macedon, and James R. Cassano, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Continuation of Ser. No. 649,371, Jan. 15, 1976, abandoned. This application Aug. 15, 1977, Ser. No. 824,885**

**Int. Cl.² B65H *5/22, 29/00***

**U.S. Cl. 271—3** **1 Claim**

1. Apparatus for storing and feeding selected sides of selected documents to and from an exposure station for copying the selected documents comprising:

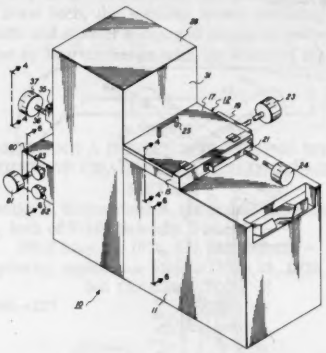
(a) xerographic reproduction apparatus having an exposure station including a document exposure platen and liftable platen cover means for covering said platen and for providing a document exposure pocket over said platen;

(b) a rack having a plurality of superposed storage pockets for individually storing documents;

(c) means for moving a selected one of said storage pockets to a predetermined location adjacent said document exposure station;

(d) fluidic means for fluidicly moving a selected document into and out of one side of a selected said storage pocket into and out of said document exposure pocket over said platen for copying without lifting said platen cover means; and

(e) inverting means for inverting documents in any selected one of said plurality of storage pockets;



(f) wherein said inverting means for fluidicly moving a selected document in and out of a selected storage pocket at a different side of said storage pocket than the side thereof utilized in said movement into and out of said document exposure pocket, and for inverting the document so moved so as to allow said document copying and inverting operations to be executed at about the same time, thereby expediting the production of duplex copies, and so that both sides of a selected document may be copied on said platen within said document exposure pocket formed by said platen cover means without lifting said platen cover means.

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**4,109,904**

## PASSENGER SLIDE

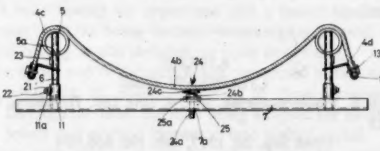
**Klaus Becker; Jürgen Cittrich, and Karl-Ernst Kaufmann, all of Wetter (Ruhr), Fed. Rep. of Germany, assignors to Demag A.G., Duisburg, Fed. Rep. of Germany**

**Filed Sep. 9, 1976, Ser. No. 722,065**

**Claims priority, application Fed. Rep. of Germany, Sep. 9, 1975, 2540044**

**Int. Cl.² A63G *21/00***

**U.S. Cl. 272—56.5 R** **9 Claims**



1. An artificial downhill run, comprising

(a) a plurality of prefabricated elongated slide segments placed end to end to form said run;

(b) a plurality of anchored spaced apart transverse bearings positioned along said run;

(c) each of said segments including integral flanges along each side edge thereof;
(d) tube-shaped rail means extending longitudinally along each side edge of said run for supporting said flanges;
(e) strut means extending between each of said bearings and said rail means on each side of said run; the improvement characterized by
(f) each of said strut means being rigidly attached to said bearings;
(g) said rail means including a bore hole in the bottom surface thereof adjacent each strut means;
(h) each of said strut means extending through its adjacent bore hole in said rail means;
(i) butt straps extending between each said strut means and the adjacent integral flange of said segments;
(j) a butt strap extension on each said butt strap; and
(k) a lift-off guard fixed to each strut means and engaging the top surface of each butt strap extension.

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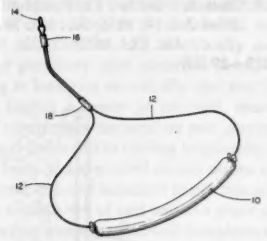
**4,109,905**

## DEVICE FOR IN PLACE SWIMMING

**Ernst Johann Meier, Mutschellen, Switzerland, assignor to Elvira Quadri, Mutschellen, Switzerland**

**Filed Apr. 25, 1977, Ser. No. 790,193**
**Int. Cl.[2] A63B** *69/12*
**U.S. Cl. 272—71** **1 Claim**




1. A device for in place swimming wherein a swimmer is tethered to the side of a swimming pool in a manner that permits unrestrained swimming strokes comprising:
a water absorbent foam rubber belt member to be placed against a portion of the body of the swimmer to prevent excessive pressure on the swimmer's body and to reduce slipping,
an elastic cord attached to each end of said belt member,
means for securing said cord to said pool side, and
a slide member concentrically mounted on said cord for conforming the cord and belt member to the swimmer's body,
whereby attachment of said securing means to the side of the pool permits a swimmer who has placed the belt member about his body to swim in place against the tension exerted by the secured cord.

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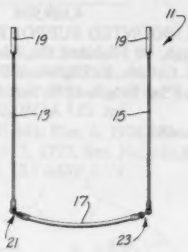
**4,109,906**

## SKIP ROPE

**Bradford W. Wilson, 1642-A Coriander, Costa Mesa, Calif. 90626**

**Filed Jan. 15, 1976, Ser. No. 649,471**
**Int. Cl.[2] A63B** *5/20, 21/02*
**U.S. Cl. 272—75** **7 Claims**

1. A skip rope comprising:
an elongated flexible member;
said elongated flexible member including first and second flexible end sections and a flexible first central section intermediate the first and second end sections whereby when the elongated flexible member is put in a generally U-shaped configuration for skipping the first and second end sections form at least substantial segments of the sides of the U and the first central section forms at least a substantial segment of the bottom of the U;
each of said end sections having an outer end and an inner end;
first and second handles coupled respectively to the outer ends of the first and second end sections;
a second flexible central section having at least one characteristic which is different from said first central section;
means releasably connecting the inner ends of the first and second end sections to the opposite ends, respectively, of the first central section whereby the first central section can be replaced with the second central section;




at least a portion of the first central section being resilient in the axial direction whereby the first central section can be used for exercises other than skipping rope; and
said first central section being heavier per unit of length than either of said first and second end sections whereby when the elongated flexible member is put in the U-shaped configuration and swung the relatively heavy bottom of the U tends to get beneath the feet of the user, said end sections being of a different material than said first central section.

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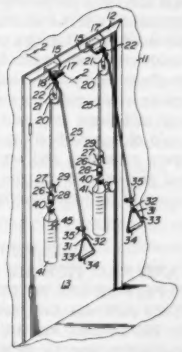
**4,109,907**

## WEIGHT LIFTING APPARATUS

**Anthony A. Zito, Hays Mill Rd., Atco, N.J. 08004**

**Filed Sep. 20, 1976, Ser. No. 725,047**
**Int. Cl.[2] A63B** *21/06*
**U.S. Cl. 272—117** **2 Claims**



1. A home exercise device comprising clip means for removable engagement over the upper edge of a door, flange means outstanding from said clip means and having at least a pair of holes, a pair of hooks for removable engagement through the holes of said flange means, a pair of pulleys suspended from respective hooks, a flexible cord trained over each pulley, a load containing bag removably connected to one end of each cord, a hand loop connected to the other end of each cord for hand manipulation of said loops against the weight of said bags,

and a head support extending removably between said hand loops for supporting the user's head in various body movement, said bags each being fabricated of flexible sheet material and including an upper end flap swingable into and out of overlying relation with its respective bag, and releasable fastener means on each bag and its flap to releasably retain the latter in its overlying relation to define an eye for detachable connection to the associated cord, additional hooks connecting each bag to its associated cord, and a retaining eye on each cord adjacent to its hand loop for releasable connection to the additional hook of the associated cord for convenient storage and portability.

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**4,109,908**

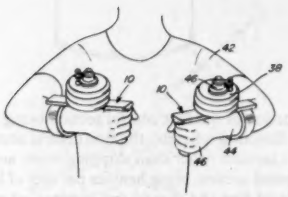
**FOREARM MOUNTED SUPPORT FOR LIFT WEIGHTS**

**Daniel B. Pugh, 40 Highland St., Medway, Mass. 02053, and Thomas M. Cataldo, 59 Highwood Dr., Franklin, Mass. 02038**

**Filed Feb. 9, 1976, Ser. No. 656,697**

**Int. Cl.[2] A63B *23/00***

**U.S. Cl. 272—119** **1 Claim**




1. An exercise weight supportive assembly, said assembly including a single one-piece elongated body having a pair of opposite side longitudinal sides, said body including only one elongated plate-like member, only one elongated weight supporting shank supported from only one of said longitudinal sides of said body with one end of said shank abutted against and permanently anchored relative to said one side centrally intermediate the opposite ends of said body and the other end of said shank projecting endwise outwardly from said one longitudinal side and adapted to have annular weights removably telescoped thereover, an elongated hand grip having one end abutted against and permanently anchored relative to one end portion of the other longitudinal side of said body with the other end of said hand grip projecting endwise outwardly from said other longitudinal side, an annular forearm receiving and engaging frame member including a peripheral portion thereof permanently anchored to said other longitudinal side adjacent the other end of said body with said annular frame member disposed in a plane substantially normal to said elongated body, the portions of said hand grip and annular frame member remote from said elongated body member being free of connecting members extending and secured therebetween, said frame and hand grip each having the exposed surfaces thereof covered by means of resilient covering material.

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**4,109,909**

**TRAINING AND PRACTICE AIR OF THE TURNTABLE TYPE, FOR USE BY ICE SKATERS**

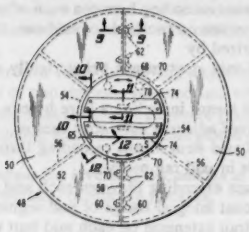
**Frank Csutor, 408 Jefferson Ave., Bristol, Pa. 19007**

**Division of Ser. No. 567,588, Apr. 14, 1975, Pat. No. 4,021,054. This application Dec. 17, 1976, Ser. No. 751,939**

**Int. Cl.[2] A63B *23/04***

**U.S. Cl. 272—146** **8 Claims**

1. A device for off-ice use by an ice skater in practicing spins on one ice skate, comprising means affording a flat surface adapted for supporting a single ice skate boot, said surface being interrupted by an elongated slot extending generally centrally thereof to receive the blade of said ice skate, including a stationary platform having a center opening, a turntable rotatably mounted in said opening, and a pair of blocks removably positioned upon said turntable for rotation therewith, said blocks cooperating to provide said flat surface, the blocks being transversely spaced a predetermined stationary distance apart such as to define an elongated slot the width of which is



greater than the thickness of an ice skate blade but less than the width of a single ice skate boot, said blocks being in supporting relation to the opposite sides of the boot of a single ice skate the blade of which extends within the slot longitudinally thereof.

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**4,109,910**

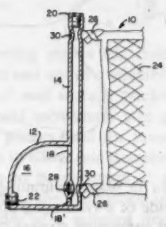
**WEIGHTED TENNIS NET SUPPORT POST**

**Theodore J. Gleason, 2 Sanders Pl., Pompton Plains, N.J. 07444**

**Filed Jul. 14, 1976, Ser. No. 705,347**

**Int. Cl.[2] A63B *71/02***

**U.S. Cl. 273—29 BB** **3 Claims**



1. Apparatus, for use in a game employing a missile and an obstacle therefor, comprising:

a mounting base having a flat bottom surface;

said mounting base comprising a hollow container defining a fluent material reservoir therewithin; and

upright means for supporting a missile obstacle;

said upright means being integral with said mounting base, and extending from said mounting base at an angle normal to said bottom surface;

said upright means having first and second opposite sides; and wherein

said mounting base is integrally fixed to said upright means at only one of said first and second sides, to render the other of said sides unobsructed;

said upright means comprises an elongate, hollow element;

said hollow element opens into said hollow container to effect a communication of the interior of said hollow element with the interior of said hollow container;

said elongate, hollow element has inlet means for introducing fluent material thereinto to fill said hollow container and said elongate, hollow element with such fluent material;

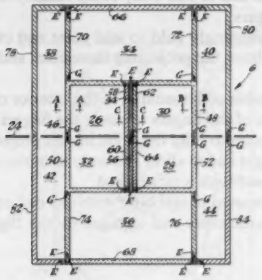
said hollow container and said elongate, hollow element define an interface therebetween along said one side; and

said hollow container and said elongate, hollow element have a walled void formed therebetween, at said one side, to facilitate an attachment thereat of a missile obstacle.

## 4,109,911
## GAMING SURFACE CONTACT DETECTING SYSTEMS

John A. Van Auken, 16 La Gorce Cir., Miami Beach, Fla. 33141

Continuation of Ser. No. 570,766, Apr. 23, 1975, abandoned.
This application Apr. 14, 1977, Ser. No. 787,474
Int. Cl.[2] A63B *19/06*
U.S. Cl. 273—31 6 Claims



2. An electrical in-ball indicator system for indicating touchdown of a ball in one or more selected zones on a tennis court playing surface or other playing surface having one or more court lines wherein the court lines bound a playing surface area, wherein each court line has a pre-selected width, and wherein said ball is provided with electrically conductive means on its outer periphery, said electrical in-ball indicator system comprising at least one electrically operated indicator, a sensing circuit having a group of exposed, spaced apart, generally parallel conductors disposed on said playing surface in at least one of said zones and extending lengthwise of at least one of said court lines, and electrical circuit means connected to said sensing circuit and said indicator to operate said indicator in response to touchdown of said ball at a place where the electrically conductive means on said ball completes a current-conducting circuit across adjacently disposed ones of said conductors in said sensing circuit, only one of said conductors in said sensing circuit being disposed out bounds of the playing surface area delimited by the outer edge of said one of said court lines, and the remainder of said conductors in said sensing circuit being disposed in bounds of the playing surface area delimited by the outer edge of said one of said court lines.

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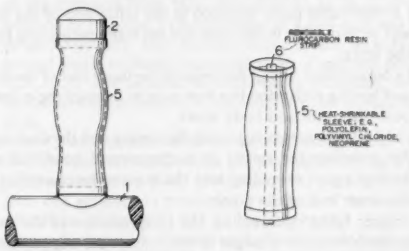
## 4,109,912
## NIGHT STICK STRUCTURE

John Hobart Zentmyer, 124-F N. Brighton St., Burbank, Calif. 91506

Filed Mar. 17, 1977, Ser. No. 778,393
Int. Cl.[2] F41B *15/02*
U.S. Cl. 273—84 R 10 Claims




1. The method of making a baton having an auxiliary handle that includes the steps of;
(a) providing a baton having an elongated shaft and an upstanding auxiliary handle,
(b) placing a sleeve over the auxiliary handle,
(c) placing at least one strip between the sleeve and the auxiliary handle,
(d) applying heat locally and relatively evenly to the sleeve until the sleeve is shrunk to approximately the size of the auxiliary handle plus the strip, and
(e) removing the strip.

2. The method of making the baton of claim 1 in which;
(a) said strip is formed of the fluorocarbon resin polytetrafluoroethylene.

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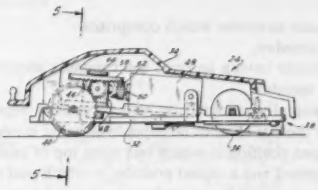
## 4,109,913
## TOY VEHICLE

Edwin A. Nielsen, Oceanside, N.Y., assignor to Ideal Toy Corporation, Hollis, N.Y.

Division of Ser. No. 747,441, Dec. 6, 1976, abandoned. This application Apr. 1, 1977, Ser. No. 783,849
Int. Cl.[2] A63F *9/14*
U.S. Cl. 273—86 B 13 Claims

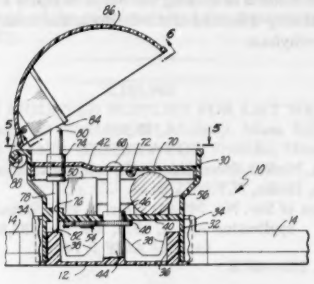


5. In a toy vehicle game including a guide track having a pair of upstanding laterally spaced side walls, at least one toy vehicle on said track including a frame, a body mounted on said frame, a plurality of ground engaging wheels mounted in said frame and including a pair of combination steering and drive wheels; means for mounting said drive wheels in said frame for independent rotation in laterally spaced fixed vertical planes; and a reversible rotary electric drive motor mounted in said frame in a fixed position, the improvement comprising drive transmission means mounted in said vehicle frame for selectively drivingly connecting said motor to the respective drive wheels to selectively drive said wheels in the forward direction of movement of the vehicle; said drive transmission means including at least one transmission element movably mounted in the frame for limited reciprocal movement between first and second predetermined positions in response to the direction of rotation of the elctric motor, and a pair of direct drive transmission trains respectively directly drivingly engaged with said drive wheels for rotation with the drive wheels regardless of the direction of rotation of the drive wheels; each of said transmission trains including one transmission element located at said first and second predetermined positions respectively for selective engagement and operation by said movable transmission element in response to the direction of rotation of the drive motor to respectively drive one or the other of said drive wheels in the forward direction of movement of the vehicle when engaged with said movably mounted transmission element while producing a biasing force on the vehicle urging it into guiding engagement with one of said side walls of the track for movement therealong in said forward direction; said transmission elements at said first and second position being located to block movement of said movably mounted transmission element beyond said first and second predetermined positions to limit said movably mounted transmission element to reciprocal movement therebetween in response to reversals of the direction of rotation of said motor.

## 4,109,914
## GAME STRUCTURE EMPLOYING A REVOLVING TARGET

Takao Matsumoto, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan

Filed Jun. 23, 1976, Ser. No. 698,917
Claims priority, application Japan, Jul. 4, 1976, 50-93481[U]
Int. Cl.[2] A63B 63/06
U.S. Cl. 273—101 9 Claims



2. A game structure which comprises:
a base member,
a receptacle having an open top rotatably mounted on said base member,
a lid pivotally mounted on said receptacle adjacent to an edge thereof so as to be capable of being moved between an open position in which said open top of said receptacle is exposed and a closed position in which said open top of said receptacle is covered,
rotating means for rotating said receptacle on said base member about a vertical axis extending through said top connecting said receptacle and said base member, and
lid lifting means for periodically moving said lid between said open and closed positions as said receptacle is rotated,
an arm attached to said base member so as to extend outwardly from said receptacle,
a propulsion means for propelling a game piece toward said receptacle, said propulsion means being mounted on said arm remote from said receptacle.

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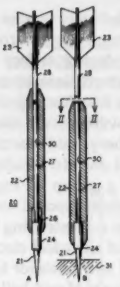
## 4,109,915
## BREAKAWAY DART

Walter Edward Bottelsen, 255 Brentwood Way, Goleta, Calif. 93017

Filed Sep. 20, 1976, Ser. No. 724,758
Int. Cl.[2] A63B 65/02
U.S. Cl. 273—106.5 R 4 Claims

1. A dart having a body that breaks away from a point upon impact with a target, comprising:
(a) an elongated dart point having a transverse dimension and having a base that has a transverse dimension and a longitudinal dimension;
(b) a dart body elongated along an axis;
(c) a pair of resilient fingers formed on one end of the body defining an axial slit having a transverse dimension greater than the point transverse dimension and less than the base transverse dimension, said fingers resiliently gripping the point base to yieldingly hold the point;
(d) and said body having a radial slot rearwardly of the base-gripping place of the fingers and intersecting the slit and having a dimension transverse of the body greater than the point base transverse dimension and having a longitudinal dimension greater than the longitudinal dimension of the base;
whereby the fingers frictionally hold the point during acceleration and flight and allow the body to move over the point upon impact with a target, so that the body falls free of the point.

2. A dart having flights that break away upon impact of the dart with a target, comprising
(a) an elongated dart body having an axial bore, a point end and a flight end
(b) flights yieldingly held to said flight end of said body and having a part projecting into the bore;
(c) said point end of said body being radially slotted to form collet fingers
(d) a point yieldingly held to said point end of said body in said axial bore, but projecting therefrom, and between said fingers;
(e) an adjustable collet secured to the exterior of said body in the region of the fingers to cause the fingers to adjustably grip the point to hold the point in said projecting position during flight and to allow the body to move over the point upon impact with a target; and
(f) a stem disposed in said bore with one end engaged by the point and the other end engaged by the flights; whereby



impact of the dart on a target causes the body to overside the point, moving the stem rearwardly in the body to eject the flights from the body.

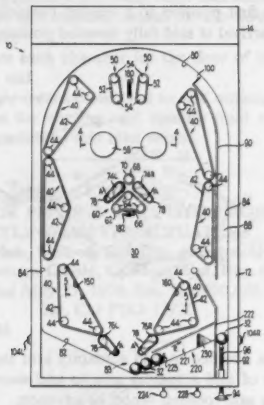
3. A dart that has a breakaway body upon impact with a target, comprising:
(a) a dart body having a bore in one end;
(b) a removable point disposed in the outer end of the bore and reciprocable in the bore and normally projecting from the body;
(c) a compressed spring disposed in the inner end of the bore and having expansion in a free state to contact the point to push the point and body apart;
(d) and trigger means engaging the spring and the dart body for retaining the spring in a compressed condition and having a part extending into the bore to be contacted by the inner end of the point;
said trigger being operated by the reciprocation of the point when the dart strikes a target to disconnect the trigger means from the body by the movement of the body toward the point, which allows the inner end of the point to contact the trigger means to operate the trigger.

**4,109,916**

## PINBALL GAME WITH SIMULTANEOUS PROJECTORS

**Jeffrey D. Breslow, Highland Park, and Eugene Jaworski, Park Ridge, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.**

**Filed May 17, 1976, Ser. No. 687,402**
**Int. Cl.[2] A63D *3/02, 13/00***
**U.S. Cl. 273—121 A** **2 Claims**



1. A pinball game apparatus, comprising:

an inclined playing board having a ball exit opening formed in the lower portion thereof and a ball entrance opening formed in the upper portion thereof;

means for propelling a ball through said entrance opening so that the ball may gravitate downwardly over the playing board;

two pairs of transversely aligned actuatable flippers pivotally mounted on the playing board for contacting the ball rolling thereover to change the direction of travel of the ball;

mechanical linkage means for simultaneously actuating said pairs of flippers for pivotal movement, said linkage means including gear means between an upper pair of said flippers and crank means between a lower pair of said flippers to rotate the flippers of each pair in opposite directions;

a plurality of player operable switches electrically connected in parallel between a power supply and a first single solenoid for operating said linkage means for simultaneous actuation of all of said flippers in response to manual operation of any of said switches;

a plurality of rocking wafer-type ball bumpers mounted on the playing board for engagement by a ball rolling thereon, each bumper including a vertically movable ball projecting ring movable between a first retracted position and a second ball engaging position;

bumper drive means connected to said ball projecting ring for simultaneously moving the ball projecting rings of all of the bumpers from their first position to their second position in response to engagement of a ball with any one of said bumpers, said bumper drive means including a second single solenoid connected to all of said ball projection rings, said second solenoid being energized in response to engagement of a ball with any one of said bumpers;

a plurality of slingshot cushions, each including a resiliently flexible band mounted above the playing board by a plurality of stationary posts mounted on the playing board;

at least one actuator in proximity with each of the bands to detect the engagement of a ball with a band;

ball propulsion means adjacent each of said bands and operatively associated with the actuators for simultaneously sharply moving the same to propel a ball back over the playing board;

cushion drive means comprising a third single solenoid connected to each of said ball propulsion means for simultaneous operation of said plurality of cushions in response to engagement of any band by a ball rolling on the playing board engaging one of said bands as detected by one of said plurality of actuators; and

scoring means for registering a score whenever said first, second or third solenoids are energized by engagement of a ball with any one of said solenoid energizers.

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**4,109,917**

## TRUCKING GAME

**Sheila Starr Hatcher, 9434 Palmetto La., Shreveport, La. 71108**

**Filed Feb. 19, 1976, Ser. No. 659,282**
**Int. Cl.[2] A63F *3/04***
**U.S. Cl. 273—254** **6 Claims**

1. A trucking game comprising:

(a) a game board having a map of the continental United States outlined thereon and selected highway routes located on said map;

(b) a first set of symbols characterized by emergency locations, truckers' luck locations and deadhead locations and a second set of symbols characterized by rest locations, fuel stop locations, and "let the hammer down" locations applied to selected locations along said routes, said second set of symbols being keyed to general instructions for the players of said game;

(c) a set of instruction cards keyed to said first set of symbols whereby when one of said players locates on any one of said first set of symbols pursuant to playing said game, one of said instruction cards keyed to said one of said first set of symbols is taken and the instructions thereon followed by said one of said players;

(d) a set of load cards for determining departure and destination locations for travel along said routes;

(e) a plurality of tokens for marking the progress of said players sequentially traversing said routes pursuant to chance; and

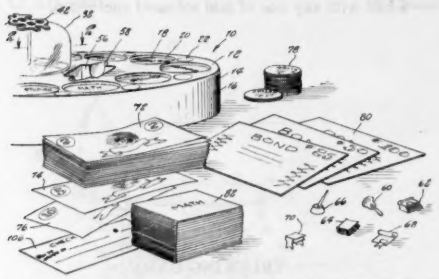
(f) means for advancing said tokens along said routes according to chance.

**4,109,918**

## LEARNING AND EARNING EDUCATIONAL GAME

**Frank Mele, and Margaret Mele, both of 607-90th St., North Bergen, N.J. 07047**

**Filed Dec. 16, 1976, Ser. No. 751,102**
**Int. Cl.[2] A63F *3/00***
**U.S. Cl. 273—256** **10 Claims**



1. A game apparatus comprising, in combination:

(a) a game board having provided thereon a sequence of playing zones defining a path of travel on the game board, first identification means for designating disciplines of learning being provided in random association with respect to each of said playing zones;

(b) a plurality of playing pieces for use by the participants, said playing pieces being positionable on said playing zones;

(c) a roulette-type spinning wheel supported on said game board and including a dial face, radial ribs dividing said dial face into a plurality of sectors, a spinner for rotating said dial face relative to said game board, a single ball for bounding between said sectors and reaching a rest position in one of said sectors, numeric designation means provided on said dial face in association with each sector representing a direction and magnitude of movement of said playing pieces along said path of travel, second identification means for designating game instructions provided on said dial face also in association with each of the same sectors;

(d) groups of cards, each group correspondingly identified with said first identification means, each card containing thereon a question and answer;

(e) additional groups of cards, each of said additional groups correspondingly identified with said second identification means, and

(f) play money for distribution among the game participants.

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**4,109,919**

## PACKAGE ACTUATED RECORD EXTRACTING MECHANISM FOR A VIDEO DISC PLAYER

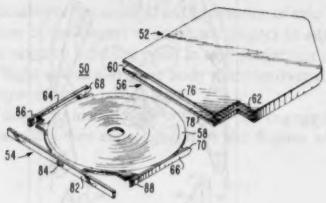
**Charles Anthony Elliott, and Larry Dean Huff, both of Indianapolis, Ind., assignors to RCA Corporation, New York, N.Y.**

**Filed May 31, 1977, Ser. No. 801,602**
**Claims priority, application United Kingdom, Dec. 20, 1976, 53176/76**
**Int. Cl.[2] G11B *3/00***
**U.S. Cl. 274—9 B** **6 Claims**

5. In a player for recovering prerecorded signals from a disc record removably subject to occupancy of a protective cover; said player including a housing having an input slot dimensioned to permit an insertion of a cover into said player and its removal therefrom; and means mounted in said player for protruding into a cover during arrival thereof at a fully inserted position in said player; said protruding means being subject to operation in a first condition and a second condition; said protruding means, while disposed in said first condition, permitting cover arrival at said fully inserted position; said protruding means, while disposed in said second condition, precluding a removal from said player of a record during a cover withdrawal from said fully inserted position after an occupied cover arrival, whereby said record is retained in said player upon completion of said cover withdrawal; an apparatus responsive to cover arrival at said fully inserted position in said player for alternating the condition of said protruding means between said first condition and said second condition; said alternating apparatus comprising:

(A) a toothed wheel rotatably mounted in said housing;

(B) an actuating arm mounted in said housing for motion from a first position to a second position in response to cover arrival at said fully inserted position in said player;



(C) means coupled to said actuating arm and responsive to motion of said actuating arm to said second position for causing said toothed wheel to advance;

(D) means mounted in said housing for urging said actuating arm to return to said first position;

(E) means mounted in said housing for preventing a reversal of motion of said toothed wheel during motion of said actuating arm to said first position; and

(F) means responsive to each advancement of said toothed wheel for causing said protruding means to alternate between said first condition and said second condition.

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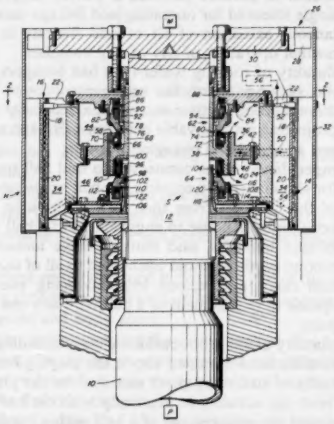
**4,109,920**

## HEAT EXCHANGER FOR SHAFT SEAL CARTRIDGE

**Winfred John Wiese, Whittier, Calif., assignor to Borg-Warner Corporation, Chicago, Ill.**

**Filed Sep. 6, 1977, Ser. No. 830,519**
**Int. Cl.[2] F16J *15/40***
**U.S. Cl. 277—17** **7 Claims**



1. A seal assembly for use with a rotary shaft and a case comprising:

a housing connected to said case;

a seal chamber defined by said housing and said shaft;

mechanical seal means in said seal chamber for preventing leakage between said shaft and said case;

cooling fluid chambers defined by said seal means and said housing;

cooling fluid impelling means between said cooling fluid chambers and further defining said chambers for causing cooling fluid to flow from said impelling means to each of said chambers;

said impelling means comprising rotor and stator means;

inlet means to said impeller means for the flow of cooling fluid thereto;

an outlet from each chamber for the flow of cooling fluid therefrom; and

heat exchanger means connected to said outlets and to said inlet means for cooling said cooling fluid which flows from said outlets to said inlet means.

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**4,109,921**

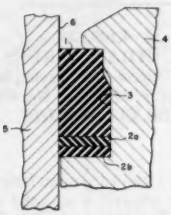
## SEAL FOR PISTONS AND PISTON RODS OF CYLINDER-TYPE ACTUATORS

**Herbert Urbaschek, Weilrod, Fed. Rep. of Germany, assignor to Taunus-Armaturen GmbH, Camberg, Fed. Rep. of Germany**

**Filed May 27, 1976, Ser. No. 690,630**

**Int. Cl.² F16J *15/20***

**U.S. Cl. 277—24** **9 Claims**




1. An annular sliding seal for axially guided concentrically paired elements, particularly for piston and cylinder pairings and piston rod and piston rod guide bore pairings of cylinder-type hydraulic actuators, the seal comprising in combination:

a cylindrical sliding surface defined by one of the two concentric elements, said sliding surface being a bore, if defined by the outer element, and a cylindrical outer surface, if defined by the inner element;

an annular groove in the other one of the two concentric elements, the groove being radially open towards the sliding surface and having axially spaced groove flanks and a groove bottom;

a first sealing ring of highly elastic, highly resilient material received within said annular groove; said sealing ring having a quadrangular cross section circumscribed by a pressure-side substantially radial flank, a pressureless flank, a received periphery in contact with the groove bottom, and a sliding periphery; said cross section having a sharp sliding edge on at least the corner between the pressure-side flank and the sliding periphery of the sealing ring; and the radial height of the sealing ring on said sharp sliding edge in relation to the diameter of the sliding surface being such that, while moving along the sliding surface, the sealing ring portion which includes that edge is radially compressed between the sliding surface and the groove bottom to such an extent that the sharp sliding edge of the ring removes any hydraulic fluid from the sliding surface and engages said surface under dry friction; and

a second sealing ring of plastically yielding material likewise received within said annular groove and axially confined between the pressureless flank of the first sealing ring and the respective flank of the groove, the second sealing ring holding a dry lubricant in such a way that said lubricant is released against the sliding surface under motion.

**4,109,922**

## SEALING DEVICE FOR A VACUUM ENCLOSURE

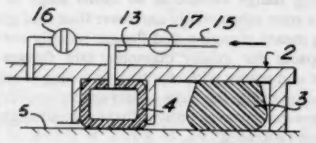
**Philippe Martin, Orsay, France, assignor to Soudure Autogene Francaise, Paris, France**

**Filed Apr. 26, 1977, Ser. No. 790,884**

**Claims priority, application France, Apr. 28, 1976, 76 12571**

**Int. Cl.² F16J *15/10***

**U.S. Cl. 277—34.3** **3 Claims**




1. A sealing device for a vacuum enclosure which can be applied against a bearing surface comprising at least two concentric annular seals mounted in a support rigidly fixed to said enclosure and extending parallel to said bearing surface, one of said annular seals being near the exterior of said enclosure and being a solid seal of flexible material, the other of said annular seals being near the interior of said enclosure and being a hollow inflatable seal, a closable duct connecting said inflatable seal to a source of fluid under pressure, said solid seal having a portion having the shape of a dihedron and directed towards said bearing surface to facilitate compression of said seal when a vacuum is drawn within said enclosure, a lateral abutment member carried by said support and disposed at right angles to said bearing surface limiting compression of said solid seal, an open housing for said inflatable seal in said support opposite said bearing surface, said duct connecting to two branch pipes and a shut-off valve for each of said pipes for communication respectively with the interior of said enclosure and with said source of fluid under pressure.

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**4,109,923**

## PIPE JOINT

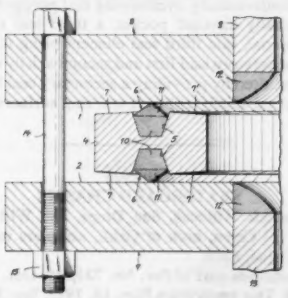
**Hans-Joachim Tückmantel, Mülheim (Ruhr), Fed. Rep. of Germany, assignor to Kempchen & Co. GmbH, Oberhausen, Fed. Rep. of Germany**

**Filed Apr. 13, 1977, Ser. No. 787,209**

**Claims priority, application Fed. Rep. of Germany, Apr. 14, 1976, 2616512**

**Int. Cl.² F16J *15/10***

**U.S. Cl. 277—101** **9 Claims**



1. In a joint between two coaxial conduits having peripheral flanges with parallel confronting surfaces transverse to the conduit axis,

the combination therewith of:

a solid annular spacer centered on said axis and inserted between said flanges, said spacer having two substantially

flat faces respectively adjoining said surfaces and being provided on each of said faces with an annular groove of outwardly diverging cross-section open toward the adjoining flange surface;

a deformable sealing ring in each groove projecting toward the adjoining flange surface, each sealing ring having a cross-section substantially in the shape of a regular pentagon which forms a flattenable gable-shaped ridge protruding from the respective groove and contacting the corresponding flange surface in an initial stage of assembly along a zone substantially narrower than said groove; and

fastening means engaging said flanges radially outwardly of said spacer for axially clamping said flanges together against said spacer with resulting flattening of said ridge of each sealing ring, the faces of said spacer converging from their annular grooves outwardly at a small angle facilitating such flattening.

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**4,109,924**

## STEPPED JOINT PISTON RING

**Charles G. Stucke, Lexington, Ky., assignor to Chemprene, Inc., Alden, N.Y.**

**Filed Jul. 12, 1976, Ser. No. 704,463**
**Int. Cl.[2] F16J 9/14**
**U.S. Cl. 277—165** **8 Claims**

1. A sealing assembly comprising, in combination, a relatively stiff but resilient first seal ring having at least one surface for engaging a counterpart surface to be sealed, said first seal ring having axial end surfaces, a second, resilient back up seal adapted to act radially on said first ring to urge it toward said counterpart surface to be sealed, said first ring having an end seal assembly comprised of circumferentially overlapping end portions of reduced axial extent, said overlapping end portions defining first and second axially opposed seal ring surfaces, one of said circumferentially overlapping end portions including a generally axially directed pocket, a third seal element of a resilient material, said third seal element being in said pocket and engaged between said first and second axially opposed seal ring surfaces, thereby providing a secondary seal between said first and second axially opposed seal ring surfaces of said first seal ring.

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**4,109,925**

## SKATEBOARD CHASSIS

**Michael Patrick Williams, San Diego, and William Howard Brawner, El Cajon, both of Calif., assignors to H.P.G. IV, Inc., El Cajon, Calif.**

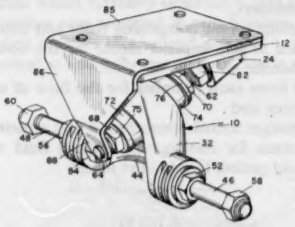
**Continuation-in-part of Ser. No. 732,649, Oct. 15, 1976, abandoned. This application Nov. 18, 1977, Ser. No. 852,624**
**Int. Cl.[2] A63C 17/02**
**U.S. Cl. 280—11.28** **18 Claims**

1. A skateboard truck assembly comprising in combination:

a mounting member for mounting to the underside of a skateboard, and including a pivot bearing socket and a tension bolt mounting means for mounting a tension bolt,

an axle assembly including a central axle member having a pivot arm having a bearing end supported in said bearing socket for pivotal movement about a pivot point,

a tension bolt extending through an aperature in said central axle and secured to said axle by means of a pair of tension compression pads and detachably secured in said tension bolt mounting means, and



adjusting means for adjusting the position of the axle with respect to the pivot point independently of the tension in said tension pads and for adjusting the tension in said tension pads independently of the position of the axle with respect to the pivot point.

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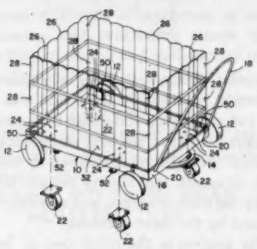
**4,109,926**

## UTILITY CART

**Gilbert M. Lane, 4017 Secor Ave., Bronx, N.Y. 10466**

**Filed Apr. 9, 1976, Ser. No. 675,606**
**Int. Cl.[2] B62B 3/02**
**U.S. Cl. 280—39** **1 Claim**



1. A utility cart comprising a rectangular rigid base portion, four rotatable wheels, four axles, each of said four axles having one of said four wheels rotatably secured thereto, axle pivot means for pivoting said each of said four axles about a pivot line transverse to the longitudinal axis of said each of said four axles, said axle pivot means pivotably securing said each of said four axles to said base portion, retaining means for selectively preventing said each of said four axles from pivoting about said pivot line, a base surface coextensive with said rigid base portion, at least four removable foraminous, wall-like elements for erecting the lateral surfaces thereof in rectangular relationship perpendicular to said base surface, securing means for interlocking the marginal adjacent edges of said foraminous, wall-like elements to each other, disengagement means enabling said foraminous, wall-like elements to disengage from said rigid base portion and from each other at said adjacent marginal edges thereof, a rigid handle portion pivotably secured to said rigid base portion, a flexible handle portion fixedly secured to said rigid base portion, said axle pivot means comprising, four first rods, one end of each of said four first rods fixedly secured to a lower surface of said base portion, four second rods, one end of each of said four second rods pivotally secured to the other end of an adjacent said each of said four first rods, four collars, said four collars having a plurality of female threads disposed on an inner surface thereof, said each of said four

second rods having a plurality of male threads disposed on an external surface thereof adjacent said one end thereof, each of said four collars being disposed rotatably secured to said plurality of male threads, wherein said plurality of female threads have a greater internal diameter than the outside diameter of said each of said four first rods at a location adjacent said other end thereof, said each of said four axles being disposed fixedly secured to an adjacent said each of said four second rods and extending radially outwardly therefrom.

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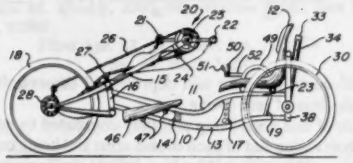
## 4,109,927
## HAND POWERED AND CONTROLLED TRICYCLE

**Randall L. Harper, 1347 Lamar, Lakewood, Colo. 80215**

**Filed Aug. 28, 1975, Ser. No. 608,662**
**Int. Cl.² B62M 1/14**
**U.S. Cl. 280—250** **14 Claims**



1. In a hand-operated tricycle having a substantially horizontal frame disposed between a forward wheel and a pair of rearward wheels with each wheel having a central rotational axis, a seat mounted on said frame, and braking means for braking said tricycle, a manual control apparatus comprising:

a steering column having one end connected to said forward wheel and inclined upwardly and rearwardly at an acute angle less than 45° with respect to said horizontal frame, said horizontal frame disposed substantially in the plane of the rotational axes of said forward and rearward wheels,

pivot means located at the forward end of said horizontal frame for pivotally connecting an intermediate portion of said steering column in laterally pivotal relation to said horizontal frame at a position substantially planar with the rotational axes of said wheels,

drive means including a crank assembly rotatably connected to the end of said steering column opposite to said one end whereby said drive means is operative to drive said front wheel by rotary motion of said crank assembly, said crank assembly having a pair of elongated arms one on either side of said steering column,

a sleeve rotatably attached to each said elongated arm in outwardly disposed relation thereto adapted to be gripped by the hands of the operator of said tricycle,

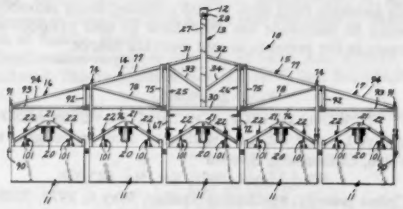
a first manually actuable means attached to one of said sleeves being selectively actuable to control the braking of said tricycle, said manually actuable means having a flexible control means interconnecting said manually actuable means and said braking means for operating said braking means by actuation of said manually actuable means, and

a first rigid arcuate guide channel mounted in fixed relation to said one of said sleeves and adapted for receiving a portion of said flexible control means, said guide channel curving outwardly from its associated said elongated arm for a distance sufficient to prevent said flexible control means from contacting said sleeve when the associated said elongated arm is rotated through a 360° arc.

## 4,109,928
## SECTIONAL GRAIN DRILL HITCH

**James F. Watkins, Alexandria, Minn., assignor to Clyde Machines, Inc., Glenwood, Minn.**

**Filed Nov. 1, 1976, Ser. No. 737,521**
**Int. Cl.² B60D 1/14**
**U.S. Cl. 280—411 R** **17 Claims**



17. A modular hitch for connecting a traction vehicle in draft relation to a plurality of independently wheeled implements in general side-by-side relationship, comprising, in combination:

a center module, a primary lateral module, and a secondary lateral module, each of said modules including a front portion, a rear portion, articulating means interconnecting said portions for relative pivotal movement about a transverse axis, and releasable means normally disabling said articulating means and locking said portions in a generally flat relative configuration;

means for connecting the front portion of said center module in supported relation to a traction vehicle;

means interconnecting said modules laterally along adjacent edges thereof, with said transverse axes lying in a common plane transverse to said hitch, for relative pivotal movement about longitudinal axes normal to said plane;

and means for connecting wheeled vehicles in supporting relation to the rear portions of said lateral modules for pivotal movement with respect thereto about further transverse axes.

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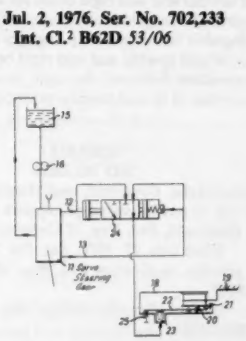
## 4,109,929
## ANTI-JACK-KNIFING APPARATUS FOR ARTICULATED VEHICLES

**László Koroknay, and István Ratskó, both of Budapest, Hungary, assignors to Autóipari Kutató Intézet, Budapest, Hungary**

**Filed Jul. 2, 1976, Ser. No. 702,233**
**Int. Cl.² B62D 53/06**
**U.S. Cl. 280—432** **1 Claim**



1. An articulated vehicle comprising a tractor (1) which has a hydraulic servo-steering gear (11), and a trailer (2) connected to said tractor by a king-pin (3) through a coupling mechanism (4); the vehicle further comprising an anti-jack-knifing apparatus which includes a clutch having a housing (18) that is connected to said tractor; at least one disc plate (5, 19) that is fixed

to said trailer; at least one pressure plate (21) in and connected to said housing for engaging said disc plate; means (20) for pressing said pressure plate toward said disc plate; a linkage (22) between said pressure plate and said housing; a lifting cylinder (23) also in said housing, serving to disengage said disc plate by way of said linkage; and a two-position hydraulic control valve (24) responsive to the position of said steering gear, connected by way of ducting (12, 13; 23/24) to the working spaces of said steering gear and to said cylinder, for normally blocking fluid flow to said cylinder, being movable to a position to introduce the fluid flow to said cylinder by an increase in the pressure in said working spaces.

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**4,109,930**

## TOWING DEVICE FOR MOTOR VEHICLES

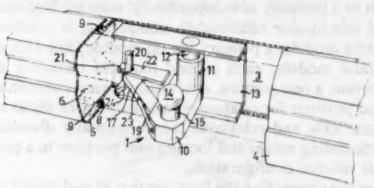
**Stig Tore Lennart Pilhall, Trollhättan, Sweden, assignor to AB Volvo, Gothenburg, Sweden**

**Filed May 4, 1976, Ser. No. 683,030**

**Claims priority, application Sweden, May 6, 1975, 7505233**

**Int. Cl.² B60D *1/06***

**U.S. Cl. 280—491 B** **4 Claims**



1. In combination a towing device and a rear bumper for vehicles, said bumper comprising a rigid beam attached to the vehicle and a soft, elongated energy-absorbing member attached to a rearwardly facing side of the rigid beam, said energy-absorbing member being formed with a storage space having a cover which is movable to uncover said storage space, said towing device comprising an upwardly-directed ball-shaped portion attached to one end of a towbar whose opposite end is pivotably connected to a mounting means attached to said rigid beam within said storage space in such a manner that the towbar is pivotable between an uncovered backwardly-directed towing position in which the ball-shaped portion is positioned completely outside said storage space, and a covered side-directed storage position within said storage space, and a locking arm pivotably journalled at one end in one of said towbar and said rigid beam for swinging movement around a vertical axle, said locking arm at the other end having a locking member that removably engages in means connected to the other of said towbar and said rigid beam so as to provide a rigid connection between the rigid beam and the towbar when the towbar is in said towing position.

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**4,109,931**

## SKI BRAKE

**Hans Woitschätzke, Grunwald, and Hennoch Geyer, Munich, both of Fed. Rep. of Germany, assignors to Trak Sportartikel GmbH, Grunwald, Fed. Rep. of Germany**

**Filed Oct. 27, 1976, Ser. No. 735,984**

**Claims priority, application Fed. Rep. of Germany, Oct. 30, 1975, 2548667**

**Int. Cl.² A63C *7/10***

**U.S. Cl. 280—605** **2 Claims**

1. A ski braking means for a ski having a running surface, an upper surface, and a body, said body having a recess, said ski braking means comprising:

two downwardly extending braking bolts positioned and guided in said recess,

said bolts, when no load is applied by a foot through a boot, protruding from the plane of said ski running surface, and, upon application of a load by a foot through a boot, lying substantially within said recess of said ski body, said ski braking means further comprising:

a pair of posts extending transversely in said recess and connected to said ski body,

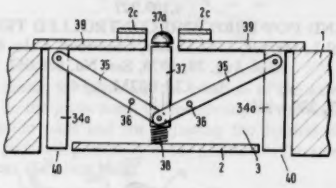
a pair of connecting arms extending longitudinally of said ski in said recess,

said arms being respectively pivotable about said posts,

a thrust bolt extending upwardly within said recess, and

a spring positioned to bias said thrust bolt upwardly,

said ski upper surface having an opening therethrough communicating with said recess for permitting said thrust bolt to extend above said ski upper surface for contacting a boot, whereby a load applied by a foot



through said boot will depress said thrust bolt against the bias of said spring,

each of said arms being pivotally connected to said thrust bolt at one end of each of said arms and being connected to a respective said braking bolt at the opposite end of each said arms,

said running surface of said ski having at least two openings therethrough for permitting said braking bolts to extend below said ski running surface when no load is applied downwardly on said thrust bolt whereby said spring moves said thrust bolt upwardly, thereby pulling up the ends of said arms connected to said thrust bolt and causing said arms to pivot about said posts and, because said arms are connected to said braking bolts, to drive said braking bolts through said openings in said ski running surface.

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**4,109,932**

## SKI BINDING OF THE TOE BINDING TYPE

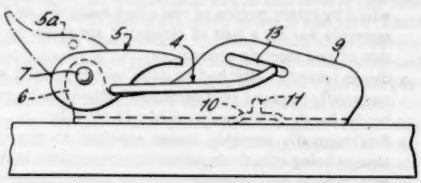
**Bror With, Oslo, Norway, assignor to Witco A/S, Oslo, Norway**

**Filed Apr. 4, 1977, Ser. No. 784,646**

**Claims priority, application Norway, Apr. 6, 1976, 761171; Nov. 15, 1976, 763895**

**Int. Cl.² A63C *9/10***

**U.S. Cl. 280—615** **7 Claims**



1. A ski binding for fastening to a ski a ski boot having an upper boot portion and a lower frontal sole portion extending ahead of said upper portion, including in combination:

a toe iron positioned on the ski and adapted to receive the ski boot and having forwardly converging lateral lugs thereon, said toe iron including a base plate adapted to engage the frontal sole portion of the boot and each of said lateral lugs formed with an inclined slotted opening therein positioned ahead of the upper boot portion to be fastened to the ski,

arresting means engageable with the sole portion of the ski boot to prevent the boot from being longitudinally retracted from the ski binding,

a toggle lever mounted to a fixed support positioned on the ski for cooperating with said toe iron, said toggle lever being pivotally movable in a vertical longitudinal plane between a clamping position and an open position, and

a clamping bail cooperating with said toggle lever and movable thereby, said clamping bail including a rear transverse portion extending through said inclined slotted opening in each of said lateral lugs and engageable with the upper surface of the frontal sole portion of the boot when the ski boot is inserted into the toe iron and said toggle lever is pivotally moved to the clamping position, a frontal transverse portion pivotally engageable with said toggle lever and leg portions interconnecting said rear transverse portion with said frontal transverse portion, with one of said transverse portions being interrupted between its ends.

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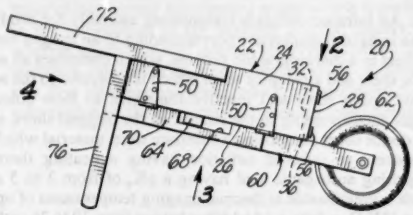
**4,109,933**

## FOLDING WHEELBARROWS

**Edward D. O'Brian, 910 Iroquois, Anaheim, Calif. 92801, and William M. Plachy, 3353 San Marcos Blvd., San Marcos, Calif. 92069**

**Filed Apr. 12, 1977, Ser. No. 786,833**
**Int. Cl. B62b *1/20***
**U.S. Cl. 280—653** **10 Claims**




1. A wheelbarrow having a body, a wheel support, a wheel and handle means,

said body including a bottom wall having front and rear ends and side edges, side walls extending upwardly from said side edges of said bottom wall, a front wall extending upwardly from said front end of said bottom wall and extending between said side walls,

said wheel support being attached to said body so as to extend to the front of said body, said wheel being rotatably mounted on said wheel support, said handle means being attached to said body so as to extend to the rear of said body

in which the improvement comprises:

said bottom wall including at least two identical bottom wall panels having adjacent edges which are located next to one another between said side edges of said bottom wall,

said front wall comprising at least two identical front wall panels having adjacent edges located next to one another between said side edges of said front wall,

a plurality of separate hinge means connecting said panels of said bottom wall to one another, connecting said panels of said bottom wall to said side walls and connecting said side walls to said panels of said front wall and connecting said panels of said front wall together,

said separate hinge means being located with respect to each other and said panels being dimensioned so as to permit Sarrus motion of said panels of said bottom and front walls and said side walls so that said body may be manipulated from a normal position into a folded position in which said side walls are located adjacent to one another, and

manually operable latched means for securing parts connected by at least one of said hinge means against folding so as to prevent said body from being folded from said normal position into said folded position.

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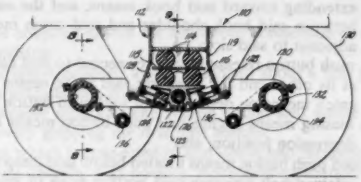
**4,109,934**

## SELF-CONTAINED FRICTIONALLY DAMPED RESILIENT SUSPENSION SYSTEM

**Hamilton Neil King Paton, 2521 W. Montlake Pl. East, Seattle, Wash. 98112; John B. Skilling, 3000 Webster Point Rd., Wash. 98105, and Frank F. Smith, Albuquerque, N. Mex., assignors to Hamilton Neil King Paton and John B. Skilling, both of Seattle, Wash.**

**Continuation-in-part of Ser. No. 457,425, Apr. 3, 1974, abandoned. This application Nov. 14, 1975, Ser. No. 631,995**
**Int. Cl.² B60G *11/24***
**U.S. Cl. 280—716** **3 Claims**



1. A rubber tired vehicle suspension for transmitting a load between an axle and a body of a rubber tired vehicle, which suspension comprises load bearing spring means comprising at least one resilient rod spring composed of an elongated body of elastomeric material having an elliptical cross-section and opposed elongated longitudinal load bearing surfaces; and mounting means for attachment between the body and axle of a rubber tired vehicle, said mounting means carrying said rod spring in a position such that load bearing compressive forces only are transmitted to said load bearing surfaces transversely of the rod spring longitudinal axis with respect to said mounting means, while simultaneously therewith permitting the unloaded rod spring surfaces to bulge freely.

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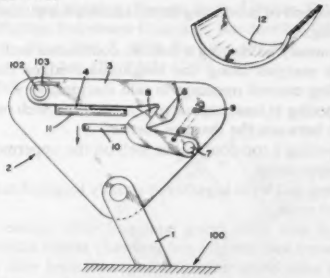
**4,109,935**

## FLAP BUCKLE

**Per Olof Weman, Hasloh, Fed. Rep. of Germany, assignor to Sigmatex, A.G., Geneva, Switzerland**

**Continuation of Ser. No. 589,990, Jun. 24, 1975, abandoned. This application Dec. 27, 1976, Ser. No. 754,211**
**Int. Cl.² A44B *13/02*; A47C *31/00***
**U.S. Cl. 280—747** **4 Claims**




1. A buckle for holding a vehicle seat belt comprising:

a. means connected to a floor of said vehicle for providing rigid support to the buckle at one end;

b. clasp means pivotally mounted at one of its terminal ends to one side of said buckle forming with said buckle a slot with a bottom edge, and located at the opposite end and having a structural configuration to receive the width of the belt, said clasp means, in closed position, extending laterally across said opposite buckle end and terminating

at its opposite terminal end by a hook means directed generally toward said one end of said buckle;

c. means for biasing said clasp means to a predetermined open position;

d. said slot being open at one end to permit entrance of the belt into the structural configuration of the slot;

e. said hook means being connected to said clasp means for pivotal movement therewith to a position adjacent to the open end of the slot;

f. catch means pivotally mounted at one of its ends to the other side of said buckle for engaging said hook means when said clasp is moved to a locking position to retain the webbing said catch means being a generally elongated member extending laterally across said buckle between said clasp means and the said one end of said buckle, an intermediate portion thereof having a catch shoulder extending toward said hook means, and the engagement between said hook shoulder and said catch means being adjacent to said slot;

g. push button release means connected to said catch means at its other end for releasing said hook means from said catch means on depression of said push button means;

h. biasing means urging said push button means to its non-depression position; and

i. said push button means located below said clasp means and retained belt between said bottom edge of said slot and said one end of said buckle and positioned so that motion depressing it is substantially perpendicular to the vehicle floor.

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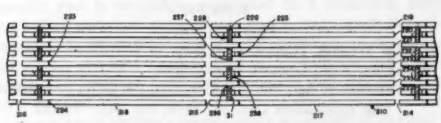
## 4,109,936
## METHOD OF PRODUCING FORM SUITABLE FOR AIRLINE TICKETING

**Donald J. Steidinger, Barrington, Ill., assignor to Wallace Business Forms, Inc., Hillside, Ill.**

**Continuation-in-part of Ser. No. 453,556, Mar. 21, 1974, abandoned, which is a continuation of Ser. No. 374,274, Jun. 27, 1973, abandoned. This application Jun. 28, 1974, Ser. No. 483,952**

**Int. Cl.[2] B41L** *1/12, 1/26*

**U.S. Cl. 282—11.5 A** **3 Claims**



1. A method of producing forms suitable for airline ticketing comprising:

continuously advancing a bottom continuous web equipped with margins along the longitudinal edges thereof and having control openings in said margins,

superposing at least one narrow continuous web on said first web between the margins thereof,

superposing a top continuous web on the uppermost of said narrow webs,

adhering said webs together at equally longitudinally spaced apart areas,

each of said webs being equipped with register openings between said margins and generally in said adhering areas, said webs being simultaneously advanced with said register openings positively aligned, at least some of said webs prior to advancement being printed, equipped with lines of perforation and carbon coating and punched for register openings,

and slitting all of said webs simultaneously along continuous straight transverse lines between said margins and adjacent said adhering areas whereby said superposed webs are suited for zigzag folding and thereafter simultaneous printing of ticket information thereon and ultimate separation into discrete tickets between said slits after slit removal of said margins, at least said narrower and top webs being transversely perforated along lines adjacent said slits but spaced therefrom sufficiently to accommodate an adhering area between each set of a slit and its associated transverse line of perforation to provide a stub.

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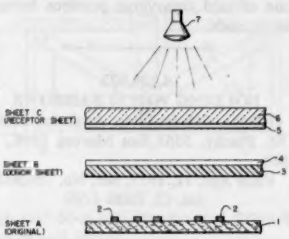
## 4,109,937
## DONOR SHEET FOR THERMOGRAPHIC IMAGING PROCESS

**Morgan E. Gager, Warwick, R.I., assignor to Trans World Technology Laboratories, Inc. (TWT Labs Inc.), Fiskeville, R.I.**

**Filed Jan. 30, 1976, Ser. No. 653,955**

**Int. Cl.[2] B41L** *1/20;* **B41M** *5/18;* **G03C** *5/16*

**U.S. Cl. 282—27.5** **22 Claims**




11. An infrared radiation transmitting assembly for producing an imaged transparency corresponding to an imaged original sheet in a thermographic process, which comprises an acid donor sheet and a receptor sheet which is receptive to the acid in said donor sheet and reactive therewith to form colored images corresponding to the images on the original sheet, said acid donor sheet comprising a substrate sheet material which is transparent to infrared radiation having a coating thereon comprising an organic acid having a $pK_a$ of from 2 to 5 and which is volatilizable at thermal imaging temperatures of up to about 175° C., a fatty acid additive having from 10 to 26 carbon atoms or a metal salt thereof, and a polymeric binder for said organic acid, and said receptor sheet comprising a clear, infrared-transmitting plastic film carrying a coating comprising a substantially colorless acid-sensitive dye precursor which develops an intense color upon reaction with said acid.

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## 4,109,938
## SYSTEM FOR ARRANGING AND RETRIEVING INFORMATION

**James A. H. Mitchell, London, and Edward J. Day, Kingston Surry, both of England, assignors to Mitchell Beazley Encyclopedias, Ltd., London, England**

**Filed Sep. 25, 1975, Ser. No. 616,865**

**Int. Cl.[2] B42F** *21/00*

**U.S. Cl. 283—43** **10 Claims**

1. An information system comprising:

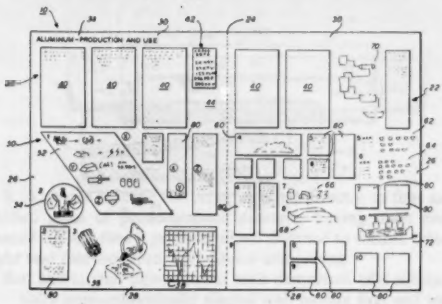
(a) first information means consisting of a plurality of graphic displays each concerning a particular selected subject:

(b) each of said graphic displays including a main word text and a pictorialized description each sufficient to describe its particular related subject with reference to the other and each disposed in a separate and distinct location within its graphic display;

(c) each pictorialized description including a key illustration and a plurality of ancillary illustrations arranged in a sequence; and

(d) second information means constituting a graphic arrangement of alphabetically set out word descriptions of a plurality of selected topics and a reproduction of a selected illustration from said graphic displays of said first information means, such illustrations pertaining to said

topics; wherein each such graphic display includes ancillary word text related to said key illustration and ancillary illustrations, displayed in close proximity to its respective illustration and arranged in numbered sequence corresponding thereto, and wherein each illustration reproduced in said graphic arrangement of said second information means includes a reference to its respective topic as described in said second information means, and a reference to the graphic display in said first information means from which the illustration was taken, and wherein one of said graphic displays includes a reference to a selected topic of said second information means which is pertinent to the information of the adjacent graphic display, and wherein another of said graphic displays includes listings including references to other selected grahic displays of said first information means which are pertinent to the information of the respective adjacent graphic display.

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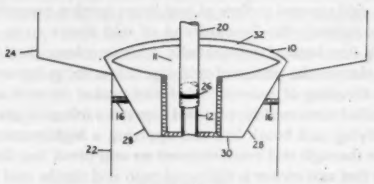
**4,109,939**

## DEVICE FOR ATTACHING A FLUID CARRYING HOSE TO A RECEPTACLE DRAIN

**Richard Steven Roberts, 1039-66th St., Brooklyn, N.Y. 11219**

**Filed May 28, 1976, Ser. No. 690,966**
**Int. Cl.² F16L** *55/00*
**U.S. Cl. 285—8** **5 Claims**



1. A device for retaining and fixing a fluid carrying hose to the drain of a sink receptacle which comprises:

(a) a cup shaped frame having side walls and a floor connected thereto, a plurality of drain holes in the floor, a hollow pipe portion through the floor; and

(b) a plurality of manually turnable screws for holding said frame in said drain which protrude through holes in the frame side walls and are capable of forming a frictional adhesion with the inside of the sink drain walls; and

(c) an adjustable band clamp capable of fixing a fluid carrying hose around the pipe portion.

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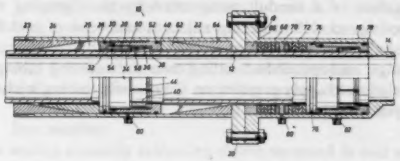
**4,109,940**

## COUPLING APPARATUS

**Bobby J. Reneau, Rte. 11, Box 380-B, Houston, Tex. 77039**

**Filed Jan. 27, 1975, Ser. No. 544,051**
**Int. Cl.² F16L** *35/00*
**U.S. Cl. 285—18** **10 Claims**



1. A pipe coupling device for leak-proof connection of two pipes comprising

a tubular sleeve adapted to be telescoped about a first pipe which extends into said sleeve;

an expandable pipe gripping means within said sleeve for selectively gripping the first pipe therein;

a housing which is connected to said sleeve and receives the first pipe therein, said housing incorporating an opening adapted to be connected into a second pipe and which pipe is to be connected to the first pipe;

an encircling fluid seal means within said housing having an outer surface which seals against said housing and an inner surface which seals against the outer surface of the first pipe on its insertion into said seal means;

first means for actuating said gripping means to grip the first pipe to hold said sleeve relative to the pipe; and wherein said pipe gripping means and said first means include

a pair of fluid actuated movable pistons;

a chamber means for said pistons which is adapted to receive fluid under pressure to force said pistons apart;

a pair of oppositely facing slips and co-acting tapered surfaces for wedging said slips toward the first pipe to grip and hold the first pipe, said slips working against each other to hold said tubular sleeve relative to the first pipe; and,

means for securing and holding said pistons apart after movement and,

second means for actuating said fluid seal means to sealing operation.

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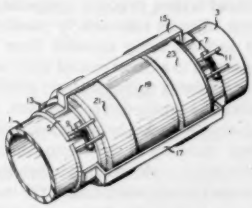
**4,109,941**

## COUPLING FOR PLASTIC PIPE

**Roy F. Wood, and Ralph A. Wynne, both of Dallas, Tex., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Jun. 8, 1976, Ser. No. 693,981**
**Int. Cl.² F16L** *17/04, 19/08*
**U.S. Cl. 285—111** **6 Claims**



1. An apparatus for connecting conduits of equal external dimensions aligned end-to-end comprising:

(a) a first section of tubing of internal dimensions to slide over juxtaposed conduits of equal external dimensions at the juxtaposition of the conduits, said first section of tubing having two grooves, one spaced from each end of the internal surface of the section;

(b) resilient gasket material for encircling said conduits and substantially filling said two grooves;
(c) encasing tubing overlying said first section of tubing at least surrounding each of said grooves; and
(d) a pair of split metal clamping rings, each ring comprising as a clamping surface on its inner surface a plurality of interspaced grooves adapted to receive the deformed surface of a conduit compressed by the clamping ring positioned with one ring adjacent each end of said first tubular section with spacer bars joining said clamping rings, said spacer bars fitting over the encasing tubing in relation to apply pressure on the encasing tubing with the split rings in clamped position.

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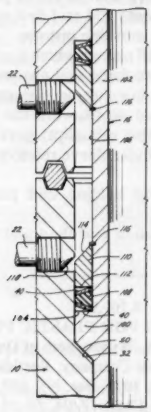
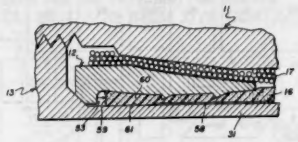
**4,109,942**
**SEAL**
**Charles Donovan Morrill, Bellaire, Tex., assignor to McEvoy Oilfield Equipment Company, Houston, Tex.**
**Division of Ser. No. 611,860, Sep. 10, 1975, Pat. No. 4,056,272, which is a continuation-in-part of Ser. No. 447,141, Mar. 1, 1974, abandoned. This application Apr. 7, 1977, Ser. No. 785,435**
**Int. Cl.[2] E21B 9/10**
**U.S. Cl. 285—140** **14 Claims**



1. In a wellhead sealing structure comprising two members having opposed adjacent substantially parallel frusto-conical surfaces, said surfaces being movable from a spaced-apart non-sealable position to a closer spaced-apart sealable position, inner and outer confining sealing surfaces positioned to enclose a space between the frusto-conical surfaces, and an annular resilient frusto-conical gasket between said surfaces and tapering in the same direction as the frusto-conical surfaces, but having a smaller cone angle whereby when the frusto-conical surfaces are in the non-sealable position the inner periphery of said gasket bears against one frusto-conical surface and the outer periphery bears against the other, and in which, upon movement of said frusto-conical surfaces to said sealable position the gasket is deformed to conform to the cone angle of said frusto-conical surfaces and sealingly engages the inner and outer confining sealing surfaces, the improvement wherein said inner and outer confining sealing surfaces are substantially vertical.

**4,109,943**
**HOSE FITTING ASSEMBLY**
**Horise M. Cooke, Weatherford, Tex., assignor to Stratoflex, Inc., Fort Worth, Tex.**
**Continuation of Ser. No. 712,785, Aug. 9, 1976, abandoned. This application Oct. 28, 1977, Ser. No. 846,596**
**Int. Cl.[2] F16L 39/02**
**U.S. Cl. 285—149** **4 Claims**



1. A field attachable fitting for use with a hose having an inner tube and an outer wire reinforcement, the hose and fitting being adapted to conduct a fluid under pressure, comprising a nipple including a tubular portion, an annular sleeve positioned coaxially with and around said tubular portion and including an insert portion, said tubular portion and said insert portion being radially spaced and forming a pocket therebetween, a socket positioned around said tubular portion and said sleeve, said socket being threadedly connected to said nipple, said fitting having a rearward end where said socket threadedly connects with said nipple and a forward end where the hose extends into said fitting, said socket and said insert portion having closely adjacent tapered surfaces, and said annular sleeve being made of a material which is permanently deformable under the pressure exerted by said socket during assembly, said insert portion being adapted to be positioned between said inner tube and said reinforcement whereby the end portion of said inner tube is received in said pocket and the end portion of said wire reinforcement extends between and is gripped by said tapered surfaces, the radial width of said pocket being slightly less than the normal thickness of said inner tube, whereby said end portion of said inner tube is placed under initial compression, said tapered surface of said insert portion extending from approximately the forward end of said sleeve to an annular break line located substantially midway along the length of said sleeve, the planes of said tapered surfaces converging in the direction of movement of said socket as said socket is threaded onto said nipple, said tapered surface of said socket overlying said break line and applying a highly compressive force through said reinforcement on said break line during the time that said socket is tightened onto said nipple, said force on said insert portion being sufficient to permanently deform the break line area of said insert portion radially inwardly and to reduce said radial width of said pocket as said socket is threaded onto said nipple and to place said end portion of said tube under higher compression, said area being displaced from the inner end of said pocket and the cross-sectional area of said pocket gradually reducing in the direction from said inner end toward said area, whereby any fluid under pressure entering said inner end of said pocket forces said end portion of said tube toward said reduced cross-sectional area, and said end portion is pressed against and forms a seal with both said tubular portion and said insert portion.

**4,109,944**

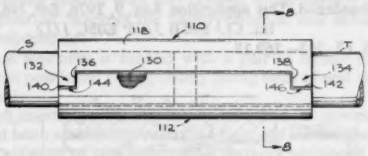
## PIPE COUPLING

**Hoyt S. Curtin, 3706 Capstan Cir., Westlake, Calif. 91361**

**Continuation-in-part of Ser. No. 537,093, Dec. 30, 1974, Pat. No. 3,971,574, which is a continuation-in-part of Ser. No. 329,727, Feb. 5, 1973, Pat. No. 3,857,588. This application Jun. 14, 1976, Ser. No. 695,462**

**Int. Cl.² F16L *13/10, 47/02***

**U.S. Cl. 285—373** **7 Claims**




1. A device suitable for being adhered directly to first and second pipes of predetermined diameter having open ends spaced by less than a predetermined distance to form a water tight seal therebetween, said device comprising:

first and second pipe sections each comprised of a substantially semi-cylindrically shaped wall having first and second longitudinal edges and an outer circumferential surface extending from said first edge to a first shoulder extending parallel to and spaced from said second edge and an inner circumferential surface for adhesion directly to said pipes extending from said second edge to a second shoulder extending parallel to and spaced from said first edge, said wall being of substantially uniform thickness between said first and second shoulders and of reduced thickness between said first shoulder and said second edge and between said second shoulder and said first edge;

each of said pipe sections further including at least two longitudinally spaced lugs formed integral with said wall and extending circumferentially beyond one of the longitudinal edges thereof, and at least two notches formed in said wall extending circumferentially inwardly from the other longitudinal edge thereof;

said lugs and notches being longitudinally aligned whereby said first and second pipe sections can be mated to one another and around said pipes with the lugs of each section received in the notches of the other section and with the reduced thickness wall portions of each section overlapping the reduced thickness wall portions of the other section, the degree of overlapping being dependent upon the extent to which the diameters of said pipes differ from said predetermined diameter, each of said lugs having a mating surface projecting circumferentially beyond the longitudinal edge from which the lug extends and each of said notches having a mating surface projecting circumferentially inwardly from the longitudinal edge from which the notch extends, said lug and notch mating surfaces being oriented so as to remain substantially in contact with one another for varying degrees of said overlapping whereby said mating surfaces can be adhered to one another.

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**4,109,945**

## APPARATUS FOR CONNECTING TOGETHER FLOWLINE END PORTIONS

**Luther L. Manchester, 810 Woodstock, Bellaire, Tex. 77401, and Bobby J. Reneau, 15527 Morales, Houston, Tex. 77032**

**Filed Feb. 7, 1977, Ser. No. 765,940**

**Int. Cl.² F16L *21/04***

**U.S. Cl. 285—323** **15 Claims**

1. Grip-seal apparatus for connecting first and second flowline members for fluid flow therethrough, comprising:

a first housing having a bore therethrough for receiving a first flowline member;

a second housing having a bore therethrough adapted for partly receiving such first flowline member extending through said first housing section bore;

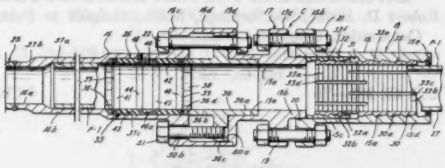
housing interconnection means for attachment to said first and second housings to interconnect same;

gripper means mounted in said first housing bore for moving radially inwardly into gripping engagement with such first flowline member simultaneously with connection of said housing interconnection means to said first housing;

sealing means mounted in said second housing bore for movement radially inwardly into sealing engagement with said first flowline member, said sealing means includes:

a resilient annular sealing assembly mounted in said second housing section bore adapted for receiving said first flowline member;

a sealing assembly activating sleeve mounted in said second housing bore for movement longitudinally into engagement with said sealing assembly for urging said sealing assembly into sealing engagement with said first flowline member;



said second housing including second housing connector means for connecting said second housing section to a second flowline member in order to establish fluid flow between said first and second flowline member; and

said housing interconnection means including an intermediate housing section having a bore therethrough and being mounted between said first and second housings and including a first housing section connection means for connecting said first housing section with said intermediate housing section and a second housing section connection means for connecting said second housing section with said intermediate housing section, said intermediate housing section including means mounted in operative engagement with said gripper means and for longitudinal movement in said first housing bore in response to said first housing connection means connecting said first housing and intermediate housing section together, said gripper means moving radially inwardly into gripping engagement with such first flowline member in response to connection of said intermediate housing section and said first housing.

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**4,109,946**

## MACRAME STAND

**Edward Lee Williams, 965 Avenue of the Pines, Grenada, Miss. 38901**

**Filed Feb. 14, 1977, Ser. No. 768,269**

**Int. Cl.² B65H *69/04*; D04G *5/00***

**U.S. Cl. 289—18** **10 Claims**

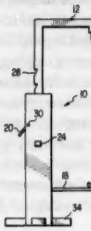
1. A stand for use in macrame wherein said stand comprises:

a first vertical member;

a second vertical member disposed partly within said first vertical member and vertically adjustable relative thereto, said second member having a horizontally extending portion adapted to secure macrame thereto; and

a horizontally extending member secured to said first verti-

cal member and adapted to secure macrame thereto, said horizontally extending member and the horizontally extending portion of said second member being generally horizontal and extending in the same direction.



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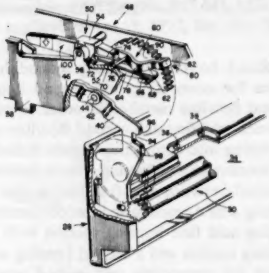
**4,109,947**

## LATCH ASSEMBLY FOR FILM LOADING DOOR

**Robert D. Leduc, Marlborough, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Filed May 2, 1977, Ser. No. 793,075**
**Int. Cl.² E05C *19/02***
**U.S. Cl. 292—76** **4 Claims**



1. Photographic apparatus comprising:

a housing including means for defining a chamber having an opening through which an object is adapted to be inserted;

a door coupled to said housing for movement in a first plane between a first position wherein said door is in closed relation with said opening and a second position wherein said door is in open relation with said opening such that the object may be inserted into said chamber via said opening;

a latch assembly actuator;

a latch assembly for securing said door in said first position, said latch assembly including first means mounted on said housing and including a surface being inclined in first and second directions relative to said first plane, and second means mounted on said door so as to be in latching engagement with each other when said door is in said first position thereby latching said door to said housing in closing relation to said opening, said first means being movable out of latching engagement with said second means in response to manual actuation of said latch assembly actuator to permit movement of said door toward said second position, and said second means being movable out of latching engagement with said first means when a predetermined force is exerted upon said door during an attempt to move said door out of said first position and toward said second position prior to manually actuating said latch assembly actuator by camming said surface so as to move said first means in a plane which defines an angle with said first plane thereby preventing damage to said latch assembly or said door; and

means for resiliently urging said first means into latching engagement with said second means when said door is in said first position.

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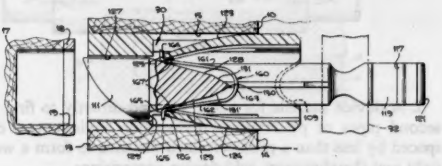
**4,109,948**

## PLASTIC LATCH BOLT FOR DOOR LOCK

**Dennis G. Potter; Hagen Dietrich, both of Delta, and Joseph Potschka, Vancouver, all of Canada, assignors to Norris Industries, South Gate, Calif.**

**Continuation-in-part of Ser. No. 712,898, Aug. 9, 1976, abandoned. This application Aug. 9, 1976, Ser. No. 712,896**
**Int. Cl.² E05B *3/08;* E05C *1/12***
**U.S. Cl. 292—169.15** **13 Claims**



1. A latch bolt sub-assembly for operation with a spindle having edge means rotatable about an axis of rotation, said sub-assembly comprising a tubular case member of synthetic plastic resin material having an outwardly facing opening, an inwardly facing opening, and a cylindrical guide bore therethrough between said openings, and a latch bolt member having a shaft slidably mounted in said case member, said shaft having roll back means at one end for engagement by the spindle and a latch bolt head at the other end, said latch bolt member comprising a cam track having an incline relative to the long axis of the latch bolt member extending from the bolt head radially inwardly toward the long axis of the latch bolt member, said tubular case member having resilient finger means comprising a cut out portion of the wall of said case member with one end anchored and an opposite free end extending toward said outwardly facing opening and biased normally into the interior of said case member and in sliding engagement with said cam track, whereby to provide a resilient force acting in a direction urging said shaft to an extended position.

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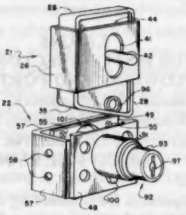
**4,109,949**

## EXTERNALLY MOUNTABLE, HIGH STRENGTH, SECURITY LOCK FOR DOORS AND THE LIKE

**Donald V. Smith, 101 Conastoga Dr. #74, Carson City, Nev. 89701**

**Continuation-in-part of Ser. No. 640,885, Dec. 15, 1975, abandoned, which is a continuation of Ser. No. 487,997, Jul. 12, 1974, Pat. No. 3,938,836. This application Apr. 7, 1977, Ser. No. 785,553**
**Int. Cl.² E05C *1/10;* E05B *65/06***
**U.S. Cl. 292—189** **6 Claims**



1. A reversibly mountable, gravity biased, security lock for external attachment to a right or left opening door or the like

in order to enable securement of said door to a door frame, said security lock including a bolt assembly having bolt assembly mounting means formed for mounting said bolt assembly to one of said door and said door frame and having a bolt member mounted thereto for movement to and from a latched and an unlatched position, and a latch assembly having latch assembly mounting means formed for mounting said latch assembly to a remainder of said door and said door frame proximate said bolt assembly, said bolt member being formed with a tapered lower surface and being formed for removal from said bolt assembly and remounting therein with said tapered lower surface in a reversed position, wherein the improvement in said security lock is comprised of:

said latch assembly is formed with a pair of striker plate surfaces positioned on oppositely facing sides of said latch assembly;

said latch assembly mounting means is formed for mounting of said latch assembly proximate a right and a left opening door with one of said striker plate surfaces positioned for cooperative engagement with said tapered lower surface of said bolt member;

said bolt member being mounted in said bolt assembly for automatic, unimpeded, upward displacement of said bolt member upon engagement of said tapered lower surface with one of said striker plate surfaces as said door is moved to a closed position and for automatic gravity biased downward displacement of said bolt member to said latched position to effect latching of said bolt member with said latch assembly when said bolt member passes beyond said one of said striker plate surfaces;

lock means formed and mounted to said latch assembly for selective locking of said bolt member directly to said latch assembly in said latched position; and

said bolt assembly, latch assembly, bolt assembly mounting means and latch assembly mounting means being formed to prevent removal of said bolt assembly and said latch assembly from said door and door frame when said bolt member is locked to said latch assembly.

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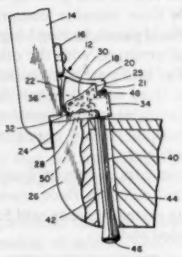
## 4,109,950
## DOOR OPENER AND LATCH

**Dagfinn O. Amdal, Rockford, Ill., assignor to Keystone Consolidated Industries, Inc., Peoria, Ill.**

**Filed Jan. 31, 1977, Ser. No. 763,827**
**Int. Cl.² E05C *13/00***
**U.S. Cl. 292—254** **6 Claims**



1. A door opener and latch device comprising, in combination:

a unitary, flexible latch bolt for attachment to a door panel, a strike for attachment to a frame, and

a semi-concealed plunger member for mounting in the frame with the strike and for engaging and operating the bolt, said bolt including a first flexible arm projecting substantially transverse to the plane of the panel, said arm including a strike engaging projection biased in a first sense by the flexible arm into locking engagement with the strike when the panel is in a closed position on the frame, said strike being affixed to the frame to receive the projection, and said plunger including a first manual actuation end projecting on the outside of the frame and a second projection engaging portion on the inside of the frame, said plunger being mounted on the strike for reciprocal movement of the projection engaging portion into and out of engagement with the projection, said projection being disengaged from the strike by manual movement of the plunger to release the projection from the strike against the biasing force of the flexible arm by displacing the projecting from the strike, the biasing force of the flexible arm thereby providing a spring force which substantially simultaneously displaces the projection in the first sense from the strike and separates the panel from the frame, said plunger including a flexible biasing arm integrally molded with the plunger, said flexible biasing arm engaging the strike and continuously biasing the plunger toward the position out of engagement with the bolt.

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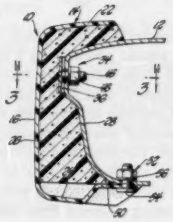
## 4,109,951
## LIGHTWEIGHT BUMPER GUARDS

**Peter A. Weller, Durham, N.H., assignor to McCord Corporation, Detroit, Mich.**

**Filed Aug. 18, 1977, Ser. No. 825,568**
**Int. Cl.² B60R *19/00***
**U.S. Cl. 293—65** **11 Claims**



1. A bumper guard assembly for a vehicle bumper comprising; a flexible, decorative outer skin member of predetermined shape including a front wall, side walls and upper and lower walls for defining a cavity opening to the rear of the assembly; a core element located within the cavity of said outer skin member for supporting said outer skin member so that it is not easily collapsible, said core element including a rear surface generally conforms to the exterior of the vehicle bumper and is adapted to engage the vehicle bumper; said outer skin member including integral flanges extending inwardly across the opening of the cavity and overlapping said core element to hold said outer skin member on said core element; and a fastener member for attaching the assembly to a vehicle bumper such that said flanges are captured between said fastener member and the vehicle bumper.

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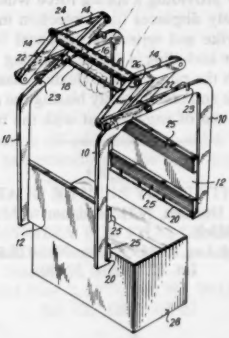
## 4,109,952
## PACKAGE LIFTER

**Michel Monzain, 674 White Plains Rd., Scarsdale, N.Y. 10583**

**Filed Feb. 9, 1977, Ser. No. 767,227**
**Int. Cl.² B66C *1/30***
**U.S. Cl. 294—16** **2 Claims**

1. A tong apparatus employing two laterally spaced pairs of jaw levers having first and second ends, respectively whereby said levers are pivotally connected intermediately of said respective first and second lever ends, cross-members rigidly connecting the levers of said pairs at points below the lever-pivotal connections for pivotal movements in unison, first and second links pivotably connected to one another joining the first ends of the levers of each pair for opening and closing said apparatus, a first handle extending between the connected links at the link pivotal connection, a second handle substantially coextensive with said first handle and extending between, and

connected to said lever-pivotal connections, said apparatus including: gripping means provided on an inner side of each of the cross-members, spring means wrappable around said second handle and having its ends in gripping contact with the jaw levers, respectively, of one of the lever pairs, for urging said jaw levers to occupy a first position causing said second jaw lever ends to be positioned closest to one another, each of said levers being substantially V-shaped and said gripping means being defined by a plurality of metal teeth disposed on



each of said cross-members in the vicinity of said second ends of said levers, and a plastic pad having a serrated surface disposed on each of said cross-members remote from second ends of said levers, respectively, said first and second handes being jointly grippable and pullable towards one another for said jaw levers to occupy a second position causing said second lever ends to be positioned furthest apart from one another, the gripping means being adapted to grip an article interposed between said jaw levers in said second position upon said first and second handles being released from the joint grip.

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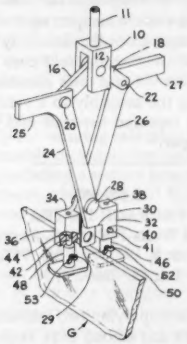
**4,109,953**

## TONGS FOR GRIPPING GLASS SHEETS

**Samuel L. Seymour, Oakmont, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Apr. 18, 1977, Ser. No. 788,493**
**Int. Cl.² B66C *1/48***
**U.S. Cl. 294—118** **7 Claims**



1. Self-closing tongs for gripping a glass sheet during thermal processing comprising a pair of tong arms, each tong arm comprising an upper tong arm portion and a lower tong arm portion, means pivotally connecting said tong arms together intermediate said upper tong arm portions and said lower tong arm portions, a pair of glass engaging elements carried by said tongs and movable into glass engaging positions against the opposite major surfaces of said glass sheet when said tongs are freely suspended, each of said glass engaging elements being of modified disc-like configuration comprising a convexly rounded, smoothly surfaced, peripheral portion that moves toward a convexly rounded, smoothly surfaced, peripheral portion of the other glass engaging element of said pair and at least one peripheral portion having a segmental portion missing therefrom, and element supporting means for each said element including pin means about which said element is eccentrically mounted for supporting said glass engaging elements on said tongs in pivotable relation thereto, means to limit the freedom of said pivoting so that said element is supported in such an orientation relative to said tongs so that said convexly rounded peripheral portions of said glass engaging elements oppose one another to engage said gripped glass sheet therebetween and the peripheral portion having said segmental portion missing is out of contact with said gripped glass sheet and means for supporting one of said glass engaging elements in its said orientation relative to one of said lower tong arm portions and means for supporting the other of said glass engaging elements in its said orientation relative to the other of said lower tong arm portions.

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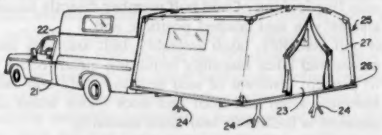
**4,109,954**

## EXPANDABLE CAMPER APPARATUS

**Richard E. Wall, 3701 E. Poinsettia Dr., Phoenix, Ariz. 85028**

**Filed Nov. 24, 1976, Ser. No. 744,731**
**Int. Cl.² B60P *3/30***
**U.S. Cl. 296—23 A** **3 Claims**



1. Apparatus for use with a pick-up truck having a pick-up bed, said apparatus including:

(a) a platform constructed and arranged to extend above and parallel to said pick-up bed and having a storage space therebelow and above said pick-up bed;

(b) a foldable floor member constructed and arranged for storage in said storage space in its folded state and being slidably mounted for entry and exit from said storage space from the rear of said pick-up truck;

(c) said foldable floor member comprising three panels, a middle one of said panels having hinges on both of its sides connected and arranged with the others of said panels so that a second of said panels folds flat against said middle panel and the third of said panels folds flat against said second panel on axes in the direction of the long axis of said pick-up bed, all of said panels presenting a flat floor when unfolded; and

(d) tent frame members constructed and arranged for placement upon said foldable floor member and adapted to receive tenting materials when said foldable floor member is in its unfolded state.

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**4,109,955**

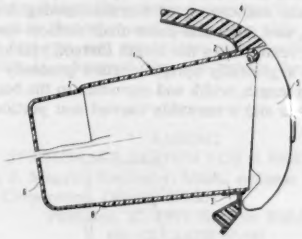
## GLOVE COMPARTMENT FOR MOTOR VEHICLES

**Rolf Amann, Renningen, and Horst Seidl, Boeblingen, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Oct. 28, 1976, Ser. No. 736,493**
**Claims priority, application Fed. Rep. of Germany, Nov. 3, 1975, 2549071**
**Int. Cl.² B60R *5/02***
**U.S. Cl. 296—37.1** **14 Claims**

1. A glove compartment for motor vehicles, which comprises a housing means retained within the area of the instrument panel, characterized in that the housing means is pro-

vided with at least one circumferential weakening means which effects a reduction of the depth of the housing means in



case of a force interaction on the glove compartment directed opposite the driving direction.

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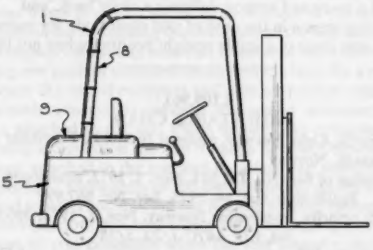
**4,109,956**

## FORKLIFT EXHAUST DEFLECTION SHIELD AND METHODS OF CONSTRUCTING AND UTILIZING SAME

**Ronald S. Roman, Novi, Mich., assignor to Faygo Beverages, Inc., Detroit, Mich.**

**Filed Jun. 4, 1976, Ser. No. 692,922**
**Int. Cl.² B60J 9/00**
**U.S. Cl. 296—78 R** **6 Claims**



1. A protection apparatus for a vehicle, comprising, in combination:

a transparent continuous sheet shield which is removably connected to said vehicle;

said vehicle comprising a substantially open forklift truck with inverted U-shaped guard rails disposed thereon and having rearward legs and including a portion for bearing occupants and a rearward portion from which exhaust fumes emanate;

said shield having a width dimension substantially equal to the width dimension of said forklift truck and a height dimension substantially equal to the height dimension of said occupant-bearing portion of said forklift truck;

said transparent shield being removably connected to said forklift truck and being substantially disposed in a vertical plane rearwardly of said occupant-bearing portion and forwardly of said rearward exhaust-emanating portion so as to deflect exhaust gases away from said occupant-bearing portion of said forklift truck;

said shield having its lowermost edge disposed adjacent the engine compartment cover of said forklift truck;

said shield having its uppermost edge disposed adjacent the uppermost rearward portions of said guard rails; and

means for mounting the shield on the guard rails of said forklift truck.

**4,109,957**

## QUICKLY REMOVABLE WINDSHIELD CURTAIN

**Joseph R. Polizzi, 5431 Pageantry, Long Beach, Calif. 90808, and Richard K. Hart, 11422 Yearling Cr., Cerritos, Calif. 90701**

**Filed Jun. 13, 1977, Ser. No. 805,721**
**Int. Cl.² B62D 25/00**
**U.S. Cl. 296—95 C** **4 Claims**

1. A quickly removable curtain assembly for covering the inside of a vehicle windshield, and front side windows forwardly of the door jamb posts of said vehicle, said curtain assembly comprising:

an opaque generally rectangular cloth panel having outer dimensions sufficient to cover the interior of said windows and extend rearwardly over the front portion of said door jamb posts;

a plurality of first snap fastener halves secured along the top edges of said panel;

a plurality of second snap fastener halves secured along the rear edges of said panel;

a plurality of suction cups, each supporting a snap fastener half removably engageable with one of said first snap fastener halves, said suction cups being removably applicable to the upper interior surface of said windshield; and

additional snap fastener halves secured to said door jamb posts and removably engageable with one of said second snap fastener halves positioned along the rear edges of said door jamb posts.

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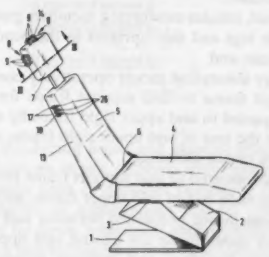
**4,109,958**

## MEDICAL TREATMENT CHAIR

**Renato Grupelli, Genoa (Quarto), Italy, assignor to Kaltenbach & Voigt GmbH & Co., Biberach an der Riss, Germany**

**Filed May 23, 1977, Ser. No. 799,691**
**Claims priority, application Fed. Rep. of Germany, May 28, 1976, 7617190[U]**
**Int. Cl.² A47C 1/02**
**U.S. Cl. 297—191** **9 Claims**



1. A medical treatment chair with a seating portion and a back portion having a backrest or a backrest with headrest, comprising;

manually actuated switches, located on said back portion, for electrically controlling operation of part of said chair;

a plurality of mounting locations on said back portion having said switches;

chair surface sections enclosing said locations;

an actuating element located pivotally in each of said switches for movement about a pivot axis between two

end switch positions and one neutral switch position between said end positions;

and a convex surface for each actuating element, said convex surface extending outside surface portions surrounding said mounting locations of the switch, said convex surface extending outside a plane containing said pivot axis and parallel to said surface portions.

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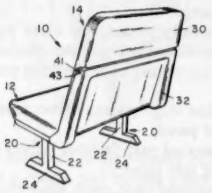
**4,109,959**

## TRANSPORTATION SEAT WITH ENERGY ABSORPTION

**Chester J. Barecki; Donald R. Lewis, both of Grand Rapids, and Terry L. Camp, Hudsonville, all of Mich., assignors to American Seating Company, Grand Rapids, Mich.**

**Filed Apr. 14, 1977, Ser. No. 787,449**
**Int. Cl.[2] B60R 21/10**
**U.S. Cl. 297—216** **18 Claims**




1. An improved transportation device for a vehicle capable of absorbing impact energy during a crash or rapid maneuver to thereby reduce or eliminate the severity of and occurence of injury to a passenger impacting the rear of the device, said device being of the type including a support frame fixedly supported in a position spaced from the floor of the vehicle, the improvement comprising:

an upper rigid frame having a generally U-shaped portion including a front stretcher and parallel side legs extending rearwardly from the ends of said front stretcher;

a rear stretcher extending transversely between said tubular frame side legs;

a slide rod extending between said front stretcher and said rear stretcher;

side uprights joining said side legs adjacent said rear stretcher to define bend areas and connected to a top cross member;

internal, tubular reinforcing members positioned within said side legs and side uprights in the bend areas of said seat frame; and

energy absorption means operatively connecting said upper rigid frame to said support frame for absorbing energy imparted to said upper rigid frame by a passenger impacting the rear of said upper rigid frame, said energy absorption means including:

a guide secured to said support frame and slidably receiving said slide rod of said upper frame; and

resilient means positioned between said support frame and said upper frame for biasing said upper frame in a rearward direction, said resilient means absorbing impact energy as said upper frame slides forward under impact.

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**4,109,960**

## LEGLESS ROCKER-RECLINER CHAIR

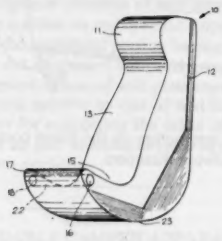
**Lawrence M. Stinchfield, 539 Beverly Ave., Paso Robles, Calif. 93446**

**Continuation-in-part of Ser. No. 746,476, Dec. 1, 1976, abandoned. This application Jun. 2, 1977, Ser. No. 802,649**
**Int. Cl.[2] A47C 3/02**
**U.S. Cl. 297—258** **6 Claims**

1. A legless rocking and reclining chair comprising,

an inner chair surface having a contour for supporting the back and seat of a seated person,

an arcuate outer surface having a length generally coextensive with said inner surface, but spaced apart from the inner surface, and connected thereto forming a closed chair body, said inner and outer chair surfaces having a smooth curvature along the length thereof, said surfaces defined by a generally upright portion generally corresponding in length, width and curvature to the back of a seated person and a smoothly curved seat portion con-




nected to the upright portion corresponding in length, width and curvature to the seat of a seated person, for reclining to an angle such that the back of a seated person may exceed 60° with respect to the vertical,

frame means for spacing said inner surface from said outer surface with maximum spacing at opposite sides of the width of the chair surfaces at least in the seat portion, said chair surfaces having a forward section defining a nose and a rearward section defining a chair back, and

balancing means in the nose of said chair body for maintaining said chair in a stable upright position when not in use.

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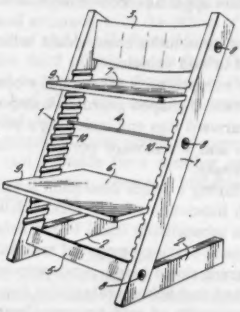
**4,109,961**

## ADJUSTABLE CHAIR

**Peter Opsvik, Oslo, Norway, assignor to Stokke Fabrikker A/S, Spjelkavik, Norway**

**Continuation of Ser. No. 411,654, Nov. 1, 1973, abandoned. This application Apr. 14, 1975, Ser. No. 567,999**
**Claims priority, application Norway, Nov. 1, 1972, 3953/72**
**Int. Cl.[2] A47C 3/20, 3/38**
**U.S. Cl. 297—338** **4 Claims**



1. An individual chair adjustable to accommodate persons of any age and size, comprising: a pair of upwardly extending spaced uprights having ground supporting members at their lower ends; a chair back rest interconnecting said uprights at their upper ends; a seat bottom plate member; and a foot rest plate; said uprights having a plurality of horizontally extending guides provided along a portion of its length at the inner surfaces of said uprights facing each other, said seat bottom plate

member and said foot rest plate each having opposite ends respectively disposed in opposite ones of said guides of said uprights at desirable locations between said ends of said uprights, said seat bottom plate member and said foot rest plate being interchangeable in dependence upon the size of the chair occupant so that when said seat bottom plate member constitutes a foot rest, said seat bottom plate member is capable of extending in a forward direction further than said foot rest plate.

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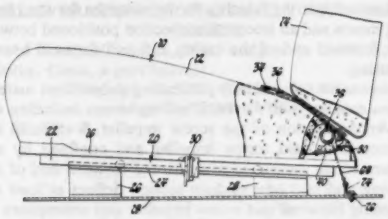
**4,109,962**

## ANCHORAGE SYSTEM FOR A SEAT BELT

**Joseph J. Magyar, Rochester, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Jun. 27, 1977, Ser. No. 810,504**
**Int. Cl.[2] A62B *35/00***
**U.S. Cl. 297—385** **3 Claims**



3. In a motor vehicle body occupant seat having a seat frame and seat adjusting means acting between the vehicle floor and the seat frame to permit adjusting movement of the seat, a seat belt system for restraining the occupant in the seat comprising: an occupant restraining seat belt associated with the seat and having one portion mounted on the vehicle body by a retractor outboard the seated occupant and another portion adapted for detachable connection inboard the seated occupant; a reel frame attached to the seat frame inboard the occupant; a reel rotatably mounted on the reel frame; a flexible element having one end attached to the reel and the other end attached to the vehicle floor rearwardly of the reel; a windup spring acting on the reel to wind and unwind the flexible element during adjusting movement of the seat frame and maintaining the flexible element in taut condition when the seat attains a desired adjusted position; a pawl pivotally mounted on the reel frame for selective locking engagement with the reel to block unwinding rotation thereof; a seat belt connecting element attached to the pawl for detachable connection with the seat belt to position the belt about the seat occupant; and spring means normally poising the pawl in an unlocking position away from locking engagement with the reel and maintaining the unlocking position upon tensioning of the seat belt about the occupant by the effort of the retractor and yielding upon imposition of seat belt loads during restraint of a seated occupant to allow movement of the pawl into locking engagement whereby the seat frame, the reel frame, and the connecting element are anchored by the flexible element against forward movement relative the vehicle floor independently of the load-sustaining capability of the seat adjusting means.

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**4,109,963**

## DUMP BODY GATE LATCH CONTROL SYSTEM

**Alfred W. Sieving, Venedy, and James M. Stanley, Oreana, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

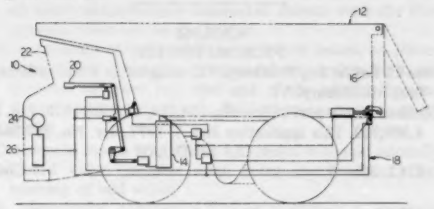
**Filed Mar. 30, 1977, Ser. No. 782,669**
**Int. Cl.[2] B60P *1/00***
**U.S. Cl. 298—23 M** **12 Claims**

1. A gate latch control system comprising:

a gate latch control assembly controllably connectable to an associated movable dump body gate, said latch control assembly being movable between a latched position at which said associated gate is maintainable at a closed position and an unlatched position at which said gate is freed to move to an open position;

latch position sensing means for sensing the position of the gate latch control assembly;

hoist control means movable between lower, hold and raise positions; and



hoist lock means for maintaining the hoist control means against movement to the raise position in response to the latch position sensing means sensing the gate latch control assembly at the latched position and for freeing the hoist control means for movement to the raise position in response to the latch position sensing means sensing the gate latch control assembly at the unlatched position.

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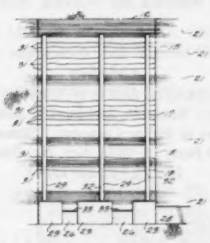
**4,109,964**

## METHOD FOR PRECONDITIONING OIL SHALE PRELIMINARY TO EXPLOSIVE EXPANSION AND IN SITU RETORTING THEREOF

**Richard D. Ridley, Grand Junction, Colo., assignor to Occidental Oil Shale, Inc., Grand Junction, Colo.**

**Continuation-in-part of Ser. No. 651,288, Jan. 22, 1976, abandoned, which is a continuation of Ser. No. 447,240, Mar. 1, 1974, abandoned. This application Jan. 3, 1977, Ser. No. 756,112**
**Int. Cl.[2] E21B *43/26***
**U.S. Cl. 299—2** **24 Claims**



1. A method of producing liquid and gaseous products including shale oil from an in situ oil shale retort containing a fragmented permeable mass of particles containing oil shale and having boundaries of subterranean deposit containing deposition layers of oil shale, wherein at least a portion of the deposition layers are bonded together as at least one competent bed, which comprises the steps of:

excavating a first portion of the deposit from within the boundaries of the in situ oil shale retort being formed to form at least one void within said boundaries, the surface of the deposit defining such a void providing at least one free face extending through the deposit within said boundaries and leaving a second portion of the deposit within said boundaries extending away from such a free face, said second portion including at least one competent bed;

fracturing such a competent bed in the second portion substantially parallel to the deposition layers for reducing the effective thickness of such competent bed;

explosively expanding the second portion, including such a fractured bed, toward such a free face for forming a fragmented permeable mass of particles containing oil shale in an in situ oil shale retort being formed; and

retorting the fragmented permeable mass containing oil shale in the in situ shale retort for producing liquid and gaseous products including shale oil.

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**4,109,965**

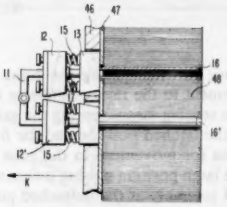
## PICKING DEVICE

**John C. Lewis, Jr., Salisbury, Vt., assignor to Tucel Industries, Inc., Middlebury, Vt.**

**Continuation-in-part of Ser. No. 618,284, Oct. 10, 1975, Pat. No. 4,009,910. This application Jan. 7, 1977, Ser. No. 757,564**

**Int. Cl.[2] A46D *1/08***

**U.S. Cl. 300—7** **7 Claims**



1. In an apparatus for making tufted constructions including a stock box for supporting parallel cut-to-length synthetic filament, means for picking a plurality of said filament to form a plurality of tufts thereof, and means for heat sealing and fusing the non-working ends of said tufts, the improvement comprising:

means for supporting said tufts in a mutually spaced relationship while the ends of said tufts are individually heat sealed and fused, simultaneously;

means for subsequently orienting said tufts so that said tufts converge whereby said oriented tufts may be mounted simultaneously on a synthetic support to form a tufted construction wherein the working ends of said tufts diverge.

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**4,109,966**

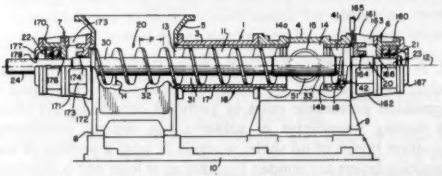
## PNEUMATIC CONVEYING DEVICE

**Donald S. Boyhont, Nazareth, and Paul E. Solt, Allentown, both of Pa., assignors to Fuller Company, Catasauqua, Pa.**

**Filed Nov. 23, 1976, Ser. No. 744,586**

**Int. Cl.[2] B65G *53/48***

**U.S. Cl. 302—50** **8 Claims**



1. Apparatus for conveying pulverulent material comprising:

a casing having a forward end and a rear end, a bore therethrough and an inlet for pulverulent material to be conveyed and an outlet for discharging pulverulent material;

a screw impeller rotatably mounted in the bore in said casing for advancing pulverulent material from said inlet to said outlet;

a pair of bearing means including a forward bearing means and a rear bearing means, each operatively connected to one end of said casing for mounting said screw impeller in the bore of said casing whereby the screw impeller is rotatably supported near both ends;

said outlet having forward and rear edges and being located intermediate the forward bearing means and the rear bearing means and being at an angle to the longitudinal axis of the bore in the casing;

said screw impeller including a shaft, a feed section which extends forwardly from said inlet and terminating at approximately the rear edge of said outlet for advancing pulverulent material from said inlet to said outlet and a reversing section extending rearwardly from near said forward bearing means and terminating at approximately the forward edge of said outlet and spaced from the feed section of the screw impeller;

means for substantially preventing pulverulent material from entering said forward bearing means;

a forward support means mounted on the forward end of said casing for operatively connecting the forward bearing means to the forward end of the casing and including a forward bearing housing for housing the forward bearing means and an intermediate section positioned between the forward end of the casing and said forward bearing housing;

said means for substantially preventing pulverulent material from entering said forward bearing means including said reversing section of the screw impeller, a material seal surrounding said screw impeller and confined by said intermediate section adjacent to the forward end of said casing and said intermediate section defines at least one opening between said screw impeller and atmosphere for allowing pulverulent material which may escape from the bore of said casing past said material seal to be discharged to atmosphere;

said outlet being spaced laterally from said shaft; and

means mounted on said shaft adjacent said outlet having a height less than the height of the feed section for reducing the effective distance between said shaft and said outlet whereby a material seal is formed having a length equal to approximately the distance between the outlet and the means for reducing the effective distance.

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**4,109,967**

## BRAKE-FORCE DISTRIBUTOR FOR DUAL-CIRCUIT BRAKE SYSTEMS

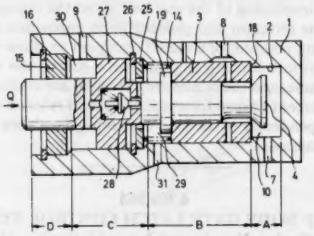
**Bernd Schopper, Frankfurt, Fed. Rep. of Germany, assignor to ITT Industries, Incorporated, New York, N.Y.**

**Filed Jun. 29, 1977, Ser. No. 811,007**

**Claims priority, application Fed. Rep. of Germany, Aug. 26, 1976, 2638377**

**Int. Cl.[2] B60T *11/34***

**U.S. Cl. 303—6 C** **32 Claims**



1. A first brake-force distributor for dual-circuit brake systems which includes a housing and is adapted to influence a connection of a first brake circuit between a brake-pressure source and wheel-brake cylinders and a piston to make said connection adapted to be acted upon in the closing direction by the pressure of said first brake circuit in opposition to a

control force, said piston having a valve member adapted to close said connection at a valve seat, said first distributor further comprising

an arrangement preventing closing of said connection in the event of failure of a second brake circuit including

a sleeve disposed in a slidable coaxial relationship with said piston;

said sleeve having said valve seat;

said sleeve being acted upon by the pressure of said second brake circuit in the direction of said valve member and in opposition to the pressure of said first brake circuit;

said sleeve being supported by a first stop provided on said piston in opposition to said control force, and

said piston being supported by a second stop rigidly connected to said housing.

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**4,109,968**

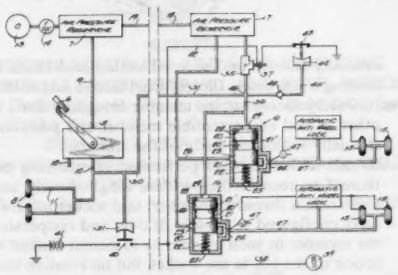
## TRACTOR-TRAILER BRAKE SYSTEM WITH IMPROVED MEANS FOR ASSURING APPLICATION OF TRAILER BRAKES CONCOMITANTLY WITH TRACTOR BRAKES

**Leo A. Wood, Milwaukee, Wis., assignor to Rollin L. Wood, Derby, Conn., a part interest**

**Filed Jul. 28, 1977, Ser. No. 819,706**

**Int. Cl.[2] B60T *15/02***

**U.S. Cl. 303—7** **3 Claims**



1. In a brake system for vehicles consisting of a tractor and a trailer, said brake system having tractor brakes and trailer brakes, separate fluid pressure responsive actuators for the tractor brakes and for the trailer brakes, two fluid pressure reservoirs, one on the tractor and the other on the trailer, means for pressurizing said fluid pressure reservoirs, manually operable brake-applying control valve means on the tractor having an inlet connected with the fluid pressure reservoir on the tractor and outlet means connected with the fluid pressure responsive actuators of the tractor brakes and with a service line that leads to and has an end on the trailer, electric circuit means having a part thereof on the tractor and another part thereof on the trailer, and means activated concomitantly with brake-applying actuation of said control valve means for energizing said electric circuit means by connecting it with a source of current,

improved means for reducing lag in the application of the trailer brakes to an inconsequential time interval after brake-applying actuation of said manually operable control valve means, comprising the combination of:

A. a relay valve on the trailer having an inlet port connected with the fluid pressure reservoir on the trailer, and outlet port means connected with the fluid pressure responsive actuators for the trailer brakes,

said relay valve having a pressure chamber with a service intake port at all times unrestrictedly connected with said end of the service line, one wall of said pressure chamber being movable and biased to a position communicating the outlet port means of the relay valve with atmosphere, and movable away from said position in response to fluid pressure of a predetermined magnitude in said pressure chamber to disrupt communication of said outlet port means with atmosphere and establish communication between the outlet port means and the inlet port of the relay valve and hence with the fluid pressure reservoir on the trailer sufficient to cause the fluid pressure responsive actuators for the trailer brakes to take up the slack in the trailer brakes;

B. duct means communicating the service intake port of the pressure chamber and the end of the service line that is at all times unrestrictedly connected thereto with the fluid pressure reservoir on the trailer;

C. a normally closed valve in said duct means so placed therein that upon the opening of said valve both said pressure chamber and said end of the service line are directly connected with the fluid pressure reservoir on the trailer;

D. solenoid means operatively connected with said normally closed valve operable upon being energized to effect opening of said valve;

E. electrically conductive means including a normally closed switch for connecting said solenoid means with said electric circuit means so that the instant said electric circuit means is connected with its source of current said normally closed valve is opened and by such opening the pressure chamber of the relay valve and the adjacent portion of the service line is pressurized;

F. fluid pressure responsive switch actuating means operatively connected with said normally closed switch to open the same when the pressure at said switch actuating means exceeds a predetermined magnitude; and

G. fluid conducting means communicating said fluid pressure responsive switch actuating means with said duct means at a point therein that lies between said normally closed valve and the service intake port of said relay valve so that the pressure to which said fluid pressure responsive switch responds is that which obtains in the pressure chamber of the relay valve and said end of the service line.

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**4,109,969**

## AUTOMATIC LOAD-DEPENDENT BRAKE POWER REGULATOR FOR VEHICLES

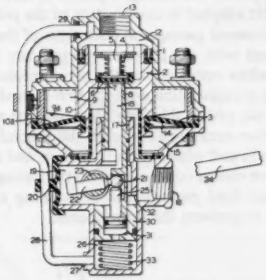
**Erich Reinecke, Beinhorn, Fed. Rep. of Germany, assignor to WABCO Westinghouse GmbH Hannover, Fed. Rep. of Germany**

**Filed May 18, 1977, Ser. No. 798,418**

**Claims priority, application Fed. Rep. of Germany, May 21, 1976, 2622797**

**Int. Cl.[2] B60T *8/18***

**U.S. Cl. 303—22 R** **6 Claims**



1. Automatic load-dependent brake power regulator for motor vehicles and trailers having a stepped piston disposed in the upper part of the regulator housing and having a two-way valve body which is freely coxially movable in the hollow space of the stepped piston and forms, in conjunction with a valve seat fixed to the piston, an inlet valve and which is operatively connected with a valve stem coaxially disposed thereunder whose upper end face forming the operative connection forms, in conjunction with the two-way valve body, an outlet

valve and whose lower end is tensionally connected with the ball end of a rotatably supported control lever whose position is determined by the load of the vehicle, as well as having a compensating piston (25) which, disposed in the lower part of the regulator housing, supports the ball end of the control lever and is acted upon by the brake pressure controlled by the motor-vehicle brake valve or by the trailer control valve, characterized in that in the lower part of the regulator housing (1) there is provided beneath the compensating piston (25) an annular piston (30) which is provided with a slip connection (31) and can be acted upon by compressed air in the direction of movement of the compensating piston (25).

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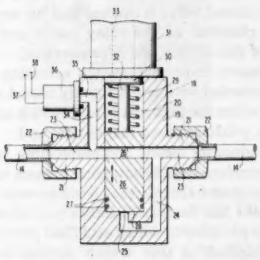
**4,109,970**

## ANTI-SKID BRAKE CONTROL SYSTEM

**Edward P. Ashby, Jr., P.O. Box #81470, Fairbanks, Ak. 99708**

**Filed May 5, 1977, Ser. No. 794,014**
**Int. Cl.[2] B60T *13/70***
**U.S. Cl. 303—116** **7 Claims**



1. In an anti-skid brake control system, a brake master cylinder for pressurizing the system responsive to brake pedal pressure, wheel brake cylinders, fluid conduit means interconnecting said master cylinder and wheel brake cylinders, and a pulsator unit connected in said conduit means between said master cylinder and said wheel brake cylinders, said pulsator unit comprising a casing having a bore and a passage intersecting the bore and connected in said conduit means, said casing having a second passage interconnecting one end of the bore with the first-named passage on one side of the bore, said casing having a third passage communicating with the first-named passage on the other side of said bore and extending to the exterior of the casing, a piston in said bore and having a cross port adapted in one position of the piston to register with the first-named passage on both sides of the bore, drive means connected with the piston to reciprocate it in said bore, the piston when retracted by the drive means having said cross port out of registration with the first-named passage and a solid part of the piston then blocking the first-named passage, the piston then creating suction in the second passage to relieve pressure in said wheel brake cylinders, and a control device for said drive means connected with the casing in communication with said third passage and responding to pressure in such passage to activate the drive means.

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**4,109,971**

## DETACHABLE ROAD PROTECTING DEVICES FOR TRACKED VEHICLES

**Chester A. Black, 6303 W. 159th St. Rte. #1, Stilwell, Kans. 66085, and Lester A. Black, 1106 Second St., Alva, Okla. 73717**

**Filed Oct. 12, 1976, Ser. No. 731,725**
**Int. Cl.[2] B62D *55/28***
**U.S. Cl. 305—51** **20 Claims**

1. Track and road protecting means for use with individual track elements of an endless tracked vehicle, successive track elements of said endless track having a transverse cleat on the outboard surface thereof adjacent one end thereof, comprising, in combination:

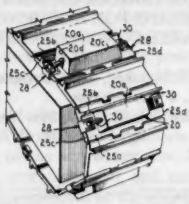
a resilient, flexible and deformable block, shape-retaining under load and adapted to fit on the outboard face of a single track element of an endless track and positioned thereon,

said block substantially rectangular in plan, side and end views and having substantially rectangular, paired and parallel sets of side faces, end faces and inboard-outboard load bearing faces,

the length of said block a substantial part of the distance from cleat to cleat of successive elements,

the height of the block substantially greater than the cleat height from the clean outboard surface of the track element, and the width of the block at least a substantial part of the width of the track,

an elongate, non-extensible element received substantially



centrally thereof and secured within said block and extending transversely thereof from side to side of the block,

an inwardly facing socket member integrally fixed to each other of said non-extensible member and positioned substantially within the body of the block,

each said socket member perforated substantially centrally thereof to receive therewithin, longitudinally axially of the block, a threaded member, said socket member internally configured to loosely fit over and cooperate with a nut member in such manner as to permit limited rocking action of the nut in the socket, but no rotation thereof,

the underside of the block relieved centrally adjacent each end thereof for access to the socket member,

a hook member on each side of said block to removably engage the side edge of a track element, and

nut and bolt means on each side of said block to removably engage the socket member with the hook members and removably fix the block on a track element.

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**4,109,972**

## MOUNTING ASSEMBLY FOR ROLLING MILL GUIDE BOX

**Holton C. Easter, Munster; Frank F. Matrinetz, Hammond, and Ted L. Myers, Chesterton, all of Ind., assignors to Inland Steel Company, Chicago, Ill.**

**Filed Dec. 14, 1976, Ser. No. 750,406**
**Int. Cl.[2] F16C *19/14, 29/00***
**U.S. Cl. 308—3 R** **10 Claims**

1. A mounting assembly for a guide box in a bar-rolling mill including rolling mill rolls wherein a bar moves along a straight, linear path portion through said guide box and the rolling mill rolls, said mounting assembly comprising:

a base;

a horizontally disposed bridge member located above said base;

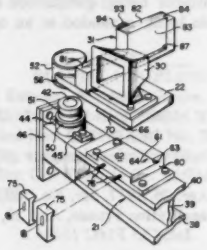
means mounting said bridge member for pivotal movement about a vertical pivotal axis, between an operative position and a position displaced from said operative position;

means on said base for supporting said bridge member at a first location on the latter adjacent said vertical pivotal axis thereof;

means on said base for supporting said bridge member, at a second location thereon remote from its vertical pivotal axis, when the bridge member is in its operative position;

said second location being spaced from said first location in a direction transverse to the direction of said straight linear path portion;

first disengageable means for engaging said bridge member when the latter is in its operative position and for securely holding it there;



means, at a third location on said bridge member, for removably mounting said guide box on the bridge member;

and second disengageable means for engaging said guide box when the latter is mounted on the bridge member and for securely holding the guide box there.

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**4,109,973**

**VEHICLE SEAT SLIDE ADJUSTER INCLUDING INTEGRALLY FORMED PAWL AND PAWL LEVER**

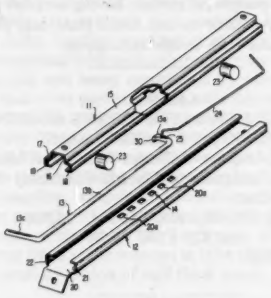
**Takami Terada, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Japan**

**Filed May 2, 1977, Ser. No. 792,884**

**Claims priority, application Japan, May 3, 1976, 51-55613**

**Int. Cl.[2] F16C *29/02***

**U.S. Cl. 308—3 R** **10 Claims**



1. A vehicle seat slide adjuster comprising:

a first moving guide rail means adapted to be secured to a vehicle seat and having a substantially inverted U-shape in section;

a second stationary guide rail means adapted to be secured to a stationary part of the vehicle and having a substantially U-shape in section, said first movable guide rail means being slidable with respect to said second stationary guide rail means;

a manually operable means including a round shaft portion longitudinally disposed within one inside section of said first guide rail means and rotatably supported thereby and a lever portion integrally formed at one end of said shaft portion of manual operation;

a pawl means integrally formed at the other end of said shaft portion for limiting the relative slidable movement between said first and second guide rail means; and

a plurality of latch holes provided on said second guide rail and aligned longitudinally thereto, each being engageable with said pawl means.

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**4,109,974**

**PLAIN AND THRUST BEARING DEVICE**

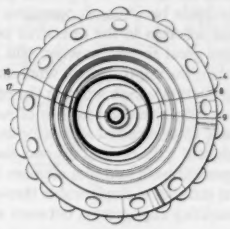
**Alf Henrik Svanstrom, and Karl-Erik Kangas, both of Fagersta, Sweden, assignors to Fagersta Secoroc AB, Fagersta, Sweden**

**Filed Jan. 25, 1977, Ser. No. 765,620**

**Claims priority, application Sweden, Feb. 16, 1976, 7601661**

**Int. Cl.[2] F16C *19/00***

**U.S. Cl. 308—8.2** **16 Claims**



1. A rotary roller bit comprising a shaft end and a roller, said roller operatively connected to the shaft end to rotate relative thereto about an axis, said roller and shaft end including plane surfaces facing and sliding against each other and forming axial thrust bearing surfaces between the shaft end and the roller, and including a friction reducing device for reducing friction at said sliding surfaces, said device including at least one groove formed in at least one of said sliding surfaces and located eccentrically relative to said axis, and including a material filling the groove and having a friction reducing effect relative to the material forming the remainder of the said facing sliding plane surfaces.

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**4,109,975**

**METHOD OF BEARING A PIVOTING MEMBER INTENDED TO TRANSMIT GREAT FORCES AND A BEARING OF SUCH A PIVOTING MEMBER**

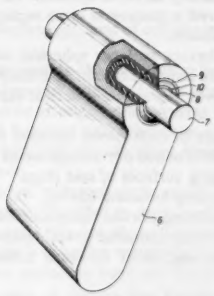
**Arne J. Mattson, Vasteras, Sweden, assignor to Paul Anderson Industrier AB, Vasteras, Sweden**

**Filed Sep. 28, 1976, Ser. No. 727,567**

**Claims priority, application Sweden, Oct. 7, 1975, 7511230**

**Int. Cl.[2] B66F *1/06;* F16C *11/02***

**U.S. Cl. 308—26** **14 Claims**



1. A method of pivotably bearing a first member on a second member by means of an axle, said first member intended to transmit great forces between said second member and a third member, and wherein said first member may constitute a load transmitting latch pivotal between an operative and an inoperative position, said method comprising the steps of:

providing opposed complementary surfaces on said first and second members which face each other but have only a small clearance therebetween when said first member is in an operative position with respect to said third member, and

pivoting said first member on said second member by an axle bearing which permits displacement of said first member with respect to said second member upon load engagement in operative position such that a load transmitting engagement is obtained between said complementary surfaces.

7. In a load transmitting assembly including a first member pivotably mounted on an axle to a second member with said first member pivotable between an operative and an inoperative position, and wherein in the operative position said first member transmits great forces between said second member and a third member, the improvement wherein: said first member has a surface portion which when in the operative position is spaced from a complementary surface of said second member through a small clearance and means for mounting said first member through said axle on said second member such that upon load engagement with said first member in said operative position said first member is displaceable through a distance to effect load transmitting engagement between said complementary surfaces.

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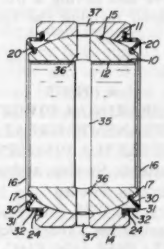
## 4,109,976
## SELF-ALIGNING BUSHING

**Hans W. Koch, Levittown, Pa., assignor to Roller Bearing Company of America, West Trenton, N.J.**

**Filed Apr. 11, 1977, Ser. No. 786,137**
**Int. Cl.² F16C *33/72, 23/00***
**U.S. Cl. 308—36.1** **2 Claims**




1. A self-aligning bushing comprising

an inner ring having an outer spherical surface with spaced grooves curved in transverse cross section and shaped for seal end retention,

an outer ring having an inner spherical surface in engagement with the outer surface of said inner ring and having spaced grooves beyond its spherical surface for seal end retention,

sealing members of elastomeric material for said rings for retaining lubricant and preventing access of dirt and water to the engaging surfaces of said rings,

each of said sealing members having

a first enlarged end portion complemental in cross section to and movably mounted in and retained in one of said grooves in said outer spherical surface of said inner ring, and

a second enlarged end portion in compressed frictional engagement in an adjoining one of said grooves in the outer ring,

said second end portion having a metallic ring insert L-shaped in cross section with a first leg portion extending toward said groove in said outer ring and a second leg portion extending outwardly from said first leg portion,

said sealing members each further comprising a connecting wall between said end portions and providing a hinge,

said connecting wall extending outwardly from the grooves of each of said rings,

said second leg portion of said metallic ring insert stiffening said connecting wall,

said sealing members upon relative movement of said spherical surfaces being compressed at one portion thereof while being expanded at an opposite portion thereof.

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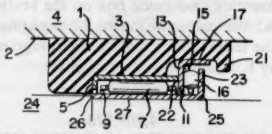
## 4,109,977
## RESILIENTLY MOUNTED RADIAL AND AXIAL BEARINGS

**Gerard Staphan, Croissy, France, assignor to Nadella, Rueil-Malmaison, France**

**Filed Apr. 20, 1977, Ser. No. 789,241**
**Claims priority, application France, Apr. 30, 1976, 76 12915**
**Int. Cl.² F16C *19/14***
**U.S. Cl. 308—174** **18 Claims**




1. A bearing assembly for supporting a rotating member in a bore, comprising a resilient sleeve of elastomeric material having an axially extending peripheral surface to be received in said bore, a radial bearing having a bush fixed within said sleeve and cylindrical rolling elements rotatable within said bush, and an axial thrust bearing within said sleeve radially inwardly of said peripheral surface having a radial plate and rolling elements rotatable on said radial plate, said plate abutting one end of said bush within said sleeve.

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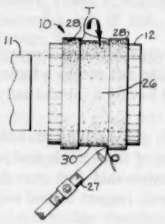
## 4,109,978
## ELECTRICALLY INSULATED SLEEVE BEARING AND METHOD OF MAKING SAME

**Richard G. Ernst, Anoka, and Charles W. Medved, Minneapolis, both of Minn., assignors to Electric Machinery Mfg. Co., Minneapolis, Minn.**

**Filed Oct. 14, 1976, Ser. No. 732,506**
**Int. Cl.² F16C *33/04***
**U.S. Cl. 308—237 R** **9 Claims**




1. A method of applying an electrical insulating layer to a tubular bearing having a machined inner surface and an as-cast outer surface comprising the steps of:

wrapping said as-cast outer surface with an epoxy resin-impregnated fibrous material; and

subjecting the wrapped tubular bearing to a heat curing cycle.

7. An electrically insulated sleeve bearing for a rotating shaft of a large electrical machine comprising:

(a) a tubular metal member having a machined inner surface providing a wear surface for the rotating shaft and an as-cast outer surface; and

(b) an electrical insulating layer wrapped about said as-cast outer surface and adhered to, said insulating layer comprising an epoxy resin-impregnated fibrous material subjected to a heat curing cycle.

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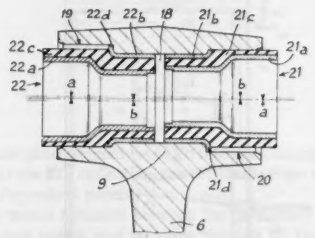
**4,109,979**

## ELASTIC COUPLING

**André Fernand Estaque, Bagneux, France, assignor to Societe Anonyme Automobile Citroen, France**

**Filed Dec. 9, 1976, Ser. No. 748,876**
**Claims priority, application France, Dec. 15, 1975, 75 38286**
**Int. Cl.² F16C *33/22*; F16F *1/16***
**U.S. Cl. 308—238** **4 Claims**




1. An elastic coupling for two elements with different characteristics of rigidity, said coupling comprising: two interfitting inner and outer parts with parallel axes, between which parts is interposed an elastic connective sleeve, said inner and outer parts being subjected to alternate stresses of relative pivoting about a theoretical axis perpendicular to a plane containing their axis, wherein said coupling has two zones of reduced radial rigidity provided at its axial ends, said zones being symmetrical with each other with respect to the theoretical pivot axis and being constituted by free spaces arranged between said outer part and said elastic sleeve, said free spaces resulting from recesses being formed in said outer part, said elastic sleeve being constituted by two half-sleeves, each being provided with an inner recess for housing said inner part which is offset in the free state with respect to its final position in the finished coupling, wherein said half-sleeves are so disposed in said outer part that their greatest radial thickness constituting thick zones are placed on the free spaces side and said inner part is force fitted in the recesses in false alignment thus constituting a precompression of said thick zones.

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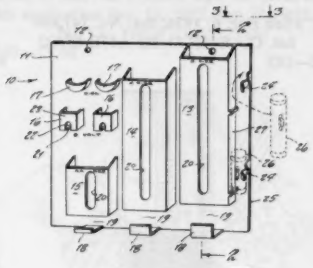
**4,109,980**

## HOME BATTERY STORAGE AND DISPENSER

**Gary Brockman; Hubert J. McFadden, and George Spector, all c/o George Spector, 3615 Woolworth Bldg., 233 Broadway, New York, N.Y. 10007**

**Filed Jun. 21, 1976, Ser. No. 698,074**
**Int. Cl.² A47F *1/00***
**U.S. Cl. 312—35** **1 Claim**

1. In a home battery storgae dispenser, the combination of an intergral flat panel with a plurality of compartments projecting from a front side of said panel, said compartments being of different sizes for holding a plurality of varying sized and shaped batteries, said compartments having top openings and means at the bottom to support the bottom battery, wherein certain of said compartments are tubular with rectangular cross-section, said means comprising a forward extending lug vertically spaced from and aligned with said compartment forming a battery stop and rest, a front side of said compartment having a vertical slot for viewing batteries in said compartment, wherein other of said comparements include a bottom wall with finger receiving opening to push said batteries upward and out a top opening, and still other compartments are semi-circular in shape, further including clips are formed on a side edge of said panel spaced laterally from a compartment for holding flashlights therebetween and a side of one said compartments provided with vertically spaced cleats to support the bottom of said flashlights wherein pneumatic cushion is provided longitudinally on said compartments having rectangular cross-section, said cushion comprising a vertical flexible strip of material sealingly mounted on said rear wall having a front portion spaced from said panel for engaging said batteries the full length of said compartment, including a lowermost portion of said strip sealingly attached to said lug forming an L-shaped bottom cushion to receive the lowermost battery, wherein said batteries are resiliently engaged by a front wall of the compartment and said cushion.



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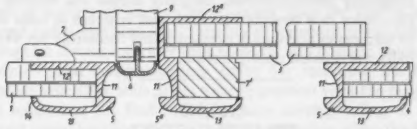
**4,109,981**

## CABINET-LIKE FURNITURE UNIT OF CELLULAR STRUCTURE

**Josephine Pfaehler, Frauenstrasse 9–11, 7900 Ulm, Fed. Rep. of Germany**

**Filed Nov. 11, 1976, Ser. No. 740,796**
**Int. Cl.² A47B *87/00***
**U.S. Cl. 312—107** **7 Claims**



1. A cabinet-like furniture unit of cellular structure, comprising

(a) cell walls separating the furniture cells from each other and having forwardly directed front edges;

(b) large-area door arrangements covering the forward open faces of said furniture cells, said door arrangements consisting of at least one pair of sliding doors and at least one pivotable door;

(c) handling ledges mounted at the edges of said doors;

(d) finger grooves provided in outer surfaces of said handling ledges and extending along the respective door edge and opening in a direction extending parallel to the main surface of the respective door and away from the respective door;

(e) profiled bands having substantially T-shaped cross-section and being inserted with their T-web portions into longitudinal grooves of said front edges of said cell walls for sheathing said front edges;

(f) said handling ledges and said profiled bands being arranged in such a manner that in the closed condition of the doors the inner longitudinal edge of said outer surface of

each handling ledge is in close proximity to one longitudinal edge of the crossbar of the associated T-profiled band, whereby — viewed from the front — said handling ledge and said T-profiled band form a homogeneous whole.

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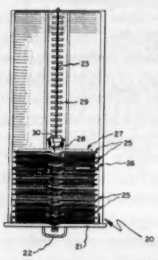
**4,109,982**

## FOLDERS/DIVIDERS AND COMPARTMENTED FILING SYSTEM

**Kenneth D. Schreyer, 5130 Brookhaven Dr., Clarence, N.Y. 14031**

**Filed Dec. 6, 1976, Ser. No. 747,499**
**Int. Cl.[2] B42F *15/00*; A47B *63/00***
**U.S. Cl. 312—183** **14 Claims**



**1.** A separator intended to rest on its vertically lower edge, for keeping classified correspondence, literature and the like segregated when installed vertically in a filing cabinet or the like, said separator including:

a vertically standing panel portion formed of characteristically thin and limp stock sheet material and having vertically extending means extending over substantially the entire vertical extent of said separator and integral therewith for deforming at least one widthwise section thereof into a permanent, resiliently set, vertically extending, corrugated configuration, whereby said separator is provided with inherent resilient stiffness in the vertical direction so as to resist downward slumping and so as to maintain an upright standing condition, wherein said separator comprises a filing folder fabricated of initially flat sheet material said folder having a front and rear panel portion integrally interconnected hingedly across the bottom of the folder in a straight line fold, and wherein at least one of said panel portions is pressed into a resiliently set vertically corrugated configuration.

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**4,109,983**

## SPEAKER CABINET

**Shouzo Kinoshita, Tokorozawa, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan**

**Continuation of Ser. No. 606,894, Aug. 22, 1975, abandoned. This application Mar. 7, 1977, Ser. No. 775,016**
**Claims priority, application Japan, Aug. 22, 1974, 49-99663[U]; May 28, 1975, 50-63020**
**Int. Cl.[2] A47B *81/00***
**U.S. Cl. 312—214** **4 Claims**

**1.** An acoustically improved speaker cabinet for housing a speaker and having a plurality of walls each having an inner surface and an outer surface, and wherein each wall comprises a rigid, sound-absorbing open-cell foamed place containing communicating bubbles and forming said inner surface, and a surface plate intimately bonded to said foamed plate and forming the outer surface of the wall, said surface plate being relatively impermeable to air, whereby the effective acoustical interior volume of said cabinet is substantially larger than the actual physical volume thereof, and whereby resonant vibration of the cabinet is eliminated.

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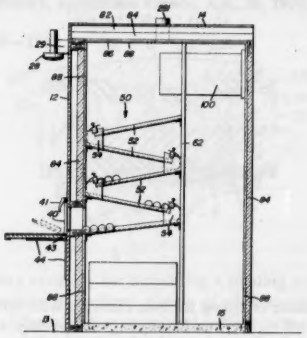
**4,109,984**

## WALK-IN COOLER CONSTRUCTION

**Nemesio N. Gandara, El Paso, Tex.**

**Filed Dec. 27, 1976, Ser. No. 754,882**
**Int. Cl.[2] H01J *1/00***
**U.S. Cl. 312—236** **4 Claims**



**1.** In a walk-in refrigerator having insulated walls, at least one of the walls having entry door therein for entry into the interior of the refrigerator, the improvement comprising:

at least one access door provided in a wall of the refrigerator, the access door being operable from exteriorly of the refrigerator; and,

dispensing means for storing and sequentially dispensing cans maintained within the refrigerator, the cans being dispensed through the access door on opening of said access door, the dispensing means comprising a plurality of at least partially enclosed guide members having curved surfaces on which the cans are adapted to roll, support members to which the ends of the guide members are mounted, and direction-reversing means for guiding the cans from an upper guide member onto a lower guide member at adjacent ends of said guide members, said guide members comprising adjusting means at the respective ends of said guide members for adjusting the flow of cans therethrough, the direction-reversing means being mounted to the adjacent ends of said guide members and to one of the support members, the dispensing means having an exit end formed of the lowermost end of the lowermost guide member, the exit end being located adjacent the opening in the wall of the refrigerator covered by the access door whereby cans are dispensed through said access door.

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**4,109,985**

## PROTECTIVE CABINET

**A. Calvin Lieb, Jr., 25 W. 9th St., Shoemakersville, Pa. 19555**

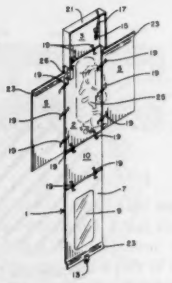
**Filed Mar. 9, 1977, Ser. No. 776,030**
**Int. Cl.[2] A47B *43/00***
**U.S. Cl. 312—262** **15 Claims**

**1.** A protective enclosure adapted to provide immediate and unencumbered access to its contents defined by a plurality of

cooperative panels that are configured to seat in mating relationship with each other, comprising:

a base panel having a plurality of rectilinear edges, each edge of which hingedly secures a dependent panel for rotation about an axis defined by the edge of the base panel to which the dependent panel is attached;

one of the dependent panels having a rectilinear edge parallel to and spaced from the edge of the base panel from which it depends;



a closure panel hingedly secured to and mounted for rotation about the axis defined by the rectilinear edge of the one of the dependent panels;

spring means mounted between the base panel and the dependent panels and between the one of the dependent panels and the closure panel biased to urge the hinged panels away from each other and into the plane of the base panel; and

releasable locking means which, when engaged, secures the panels in mating relationship with each other against the bias of the spring means.

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**4,109,986**

## ELECTRICAL CONNECTOR AND CONTACT

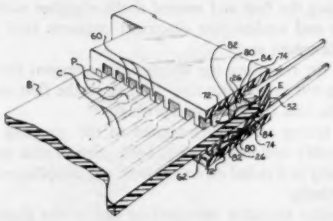
**Bob Mouissie, Berlicum, Netherlands, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Dec. 28, 1976, Ser. No. 755,128**

**Claims priority, application Netherlands, Dec. 31, 1975, 7515251**

**Int. Cl.² H05K** *1/07*

**U.S. Cl. 339—17 L** **4 Claims**



1. A printed circuit board connector comprising a dielectric housing having a slot extending along a length thereof and a plurality of opposed pairs of contacts mounted in said housing, each contact comprising a U-shaped support and plate spring, said support including a spaced pair of upstanding walls, each wall having a pair of oppositely inclinded notches, the ends of said spring being fixed in said notches, said spring being restrained in an arcuately stressed condition when so fixed and thereby being adapted to deflect and resiliently flex at its midpoint during insertion of a board into the slot and to engage the board on both sides of the midpoint, each wall being recessed to clear said midpoint.

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**4,109,987**

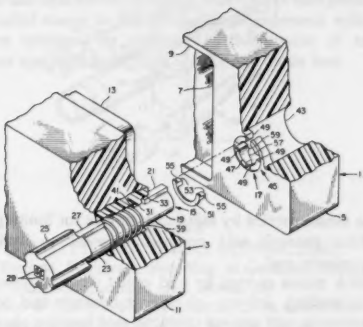
## POLARIZING AND LOCKING MEANS FOR MATEABLE UNITS SUCH AS ELECTRICAL CONNECTORS

**Normand Charles Bourdon, Sidney, N.Y., assignor to The Bendix Corporation, Southfield, Mich.**

**Continuation of Ser. No. 679,296, Apr. 22, 1976, abandoned. This application Sep. 12, 1977, Ser. No. 832,510**

**Int. Cl.² H01R** *13/54, 13/64*

**U.S. Cl. 339—75 M** **8 Claims**



1. A pair of separable connectors including polarizing means which comprises a first member mounted for rotational movement through a predetermined arc on one of said units, rotational limiting means at each end of said predetermined arc, said first member having an extension with predetermined shape including a projection on the extension, said projection located at a first radial location and being rotatable with the member through the predetermined arc; and a second member associated with the other unit and having a passage with an opening located at a second radial location chosen from a plurality of radial locations disposed about the passage, all of said locations including openings formed for receiving said projection, means for blocking such reception selectively located at certain of said openings other than the one at said second radial location, said plurality of locations separated by an angular distance greater than said arc, said passage having a predetermined complementary shape for receiving the first member when the units are in mating position with the projection located at the first radial location corresponding to the second radial location and for preventing mating when the first and second radial locations do not correspond; and locking means including means on one of the members for engaging means on the other member after assembling the units to lock the members and prevent their accidental separation.

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**4,109,988**

## DUPLEX OUTLET DEVICE

**Ernest E. Olson, 911 S. Owen, Mount Prospect, Ill. 60056**

**Filed Jul. 15, 1977, Ser. No. 815,937**

**Int. Cl.² H01R** *13/59, 33/04*

**U.S. Cl. 339—91 R** **9 Claims**

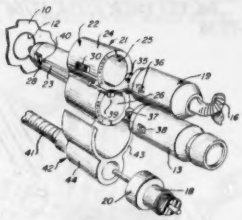
1. In an automotive vehicle having a cigarette lighter means defined by a cup-shaped first socket having an outer open end, and spaced electrical power terminals exposed within the shell, an improved duplex outlet device comprising:

housing means defining an inner plug portion arranged to be removably received in said socket, and an outer portion defining a pair of juxtaposed outwardly opening second and third sockets;

means for releasably locking said plug portion within said first socket;

electrical connection means having first contacts carried by

said plug portion for engaging said power terminals as an incident of the plug portion being disposed within said first socket, second contacts exposed within said second socket for electrical connection to an auxiliary plug inserted into said second socket, third contacts exposed within said third socket for electrical connection to a cigarette lighter plug portion inserted into said third socket, and conductor means for electrically connecting said first contacts to said second and third contacts;



fuse means carried by said outlet device for limiting current flow through said conductor means to said second contacts; and

switch means carried by said outlet device for selectively controlling delivery of current through said conductor means to said second contacts, said housing plug portion and second and third sockets being cylindrical and disposed in axially parallel relationship.

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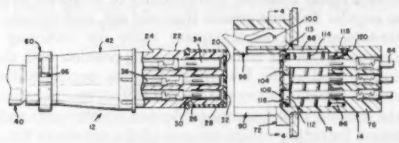
**4,109,989**

## ENVIRONMENTALLY SEALED ELECTRICAL CONNECTOR

**Clair Wilson Snyder, Jr., Hellam, and Paul Birchard Derr, Middletown, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed Jun. 10, 1975, Ser. No. 585,622**
**Int. Cl.[2] H01R *13/52***
**U.S. Cl. 339—94 M** **28 Claims**



11. A sealed plug member for an electrical connector, said plug member comprising:

a housing having a mating face on one end and at least one contact receiving bore leading to said face and, a groove about the periphery of said housing spaced from said mating face,

a like number of contacts each connected to a respective conductor and received in a respective one of said bores directed toward said mating face,

first sealing means enclosing said mating face, said first sealing means including a diaphragm portion extending across said mating face and an integral flange portion having an inwardly directed lip engaging in said groove, said first sealing means having a normally closed slot disposed over each said bore, said normally closed slot being in said diaphragm portion, and

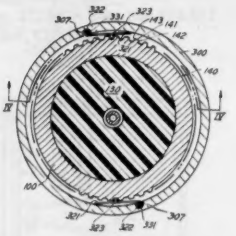
second sealing means at the other end of said housing effecting a fluid tight seal between said conductors and said housing.

**4,109,990**

## ELECTRICAL CONNECTOR ASSEMBLY HAVING ANTI-DECOUPLING MECHANISM

**Clifford Robert Waldron, Unadilla, and Carl Lee Knapp, Oneonta, both of N.Y., assignors to The Bendix Corporation, Southfield, Mich.**

**Filed May 26, 1977, Ser. No. 800,667**
**Int. Cl.[2] F16B *39/32*; H01R *13/54***
**U.S. Cl. 339—89 M** **11 Claims**



1. An electrical connector assembly comprising:

a first shell having an insert with a plurality of axial passages;

a second shell having an insert with a plurality of axial passages, said second shell having thread means of a portion of the outside of said second shell;

a plurality of pin-type electrical contacts, each mounted in a respective axial passage of one of said inserts;

a plurality of socket-type electrical contacts, each mounted in a respective axial passage of the other of said inserts, said socket-type electrical contacts arranged in the other insert in the same manner as the pin-type electrical contacts are arranged in the first insert and mateable with said pin-type electrical contacts;

a coupling nut for selectively connecting and maintaining said first and second shells together and holding said pin-type and socket-type electrical contacts together in a mated position, said coupling nut mounted for rotational movement on said first shell with thread means connectable with the thread means on the second shell for connecting the first and second shells together with the pin-type and socket-type electrical contacts held in mated relationship; and

means for retarding the rotational movement for the coupling nut in one direction relative to the first and second shells, said retarding comprising:

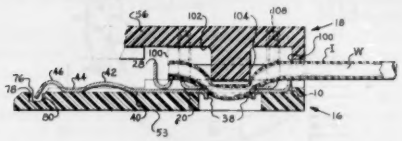
a leaf spring assembly mounted to the coupling nut, said assembly including an enlarged portion that extends inwardly in a radial direction from the coupling nut toward the shells;

an annular shoulder mounted on one of the shells and extending radially outwardly from the one shell toward the coupling nut, said annular shoulder provided with teeth on the outside surface thereof and extending radially inwardly therefrom each of said teeth having a first and second sides, one of said sides inclined at a greated angle than the other side, said spring element and said teeth positioned relative to each other so as to engage a portion of said spring element within the notched recesses to retard rotational movement in one rotational direction compared to rotational movement in the other rotational direction.

## 4,109,991
## SELF-STRIPPING ELECTRICAL CONNECTOR AND TERMINAL

Robert Franklin Evans, New Cumberland, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 468,689, May 10, 1974, abandoned. This application Sep. 18, 1975, Ser. No. 614,427
Claims priority, application Japan, May 8, 1975, 50-54335; United Kingdom, May 8, 1975, 19484/75
Int. Cl.[2] H01R *13/38*
U.S. Cl. 339—99 R 10 Claims



1. An electrical connector for insulated wires comprising, a terminal for each wire comprising a flat member having an opening therein including a pair of spaced opposing contact lips extending in said opening, and a pair of insulation-skiving blades, each insulation skiving blade substantially parallel with said flat member and overlying a contact lip; and an insulated housing comprising a base and a cover engageable with the base, said base having a surface for receiving each terminal and an opening in the surface for receiving a wire inserted between said contact lips, and the cover having a surface with means projecting toward said base for engaging an insulated wire positioned in the connector bridging said insulation skiving blades and forcing the wire between said blades, skiving the insulation to expose the wire, and engaging the wire with said contact lips, when the cover is engaged with the base.

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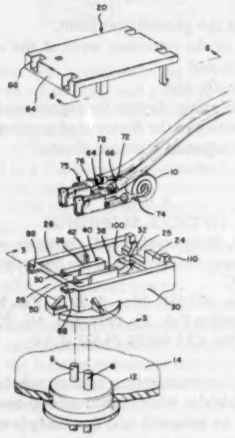
## 4,109,992
## CONNECTOR FOR COMPRESSOR HEADER

Donald Wayne Kent Hughes, Mechanicsburg, and Gary Douglas Porta, Shiremanstown, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Aug. 5, 1977, Ser. No. 822,167
Int. Cl.[2] H01R *19/34*
U.S. Cl. 339—147 R 14 Claims



1. The combination of two wires, a diode in series with one of said wires, and an electrical connector for connecting said wires to terminal posts;

said connector comprising an insulating housing having a base and sidewalls surrounding said base, said wires extending through one of said sidewalls,

said diode being contained in said housing and having two leads extending therefrom, a splice terminal in said housing, said splice terminal being crimped onto one of said wires and one of said leads,

two socket terminals in said housing, one of said socket terminals being crimped onto the other one of said wires, the other one of said socket terminals being crimped onto the other one of said diode leads,

openings in said housing for reception of said terminal posts whereby said connector can be mated with said terminal posts and said socket terminals will receive said posts, and

strain relief means in said housing in engagement with said splice terminal for preventing transmission of tensile forces applied to said wire to said one diode lead.

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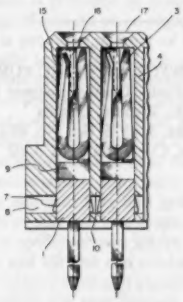
## 4,109,993
## PLUG-TYPE ELECTRICAL CONNECTORS

Gerhard Bauerle, Willsbach, Fed. Rep. of Germany, assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Continuation of Ser. No. 675,329, Apr. 9, 1976, abandoned. This application Apr. 22, 1977, Ser. No. 789,954
Claims priority, application Fed. Rep. of Germany, Apr. 11, 1975, 2515813
Int. Cl.[2] H01R *13/42*
U.S. Cl. 339—176 M 3 Claims



1. A plug-type connector comprising:

a housing including a contact receiving opening having a stop shoulder adjacent thereto and an insulating strip receiving chamber communicating with said opening and being of substantially greater dimension than said opening, and having a locking shoulder portion;

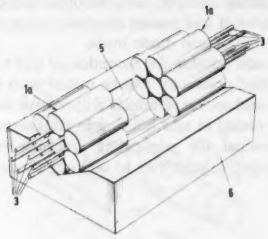
a contact comprising a terminal post at each end thereof and a U-shaped portionintermedite said ends, said U-shaped portion extending laterally of the contact axis from one side of said contact; and

an insulating strip having a first recess, said first recess being dimensioned for receiving said U-shaped portion, and a protrusion within said first recess dimensioned for being received within said U-shaped contact portion for locking said contact within said insulating strip, said insulating strip also being dimensioned for being received within said insulating strip receiving chamber in abutment with said stop shoulder and having a second recess for engaging said locking shoulder portion for locking said insulating strip and said contact within said housing.

## 4,109,994
## SINGLE OPTICAL FIBER CONNECTOR

Martin Chown, Harlow, England, assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Feb. 17, 1977, Ser. No. 769,555
Int. Cl.[2] G02B 5/14
U.S. Cl. 350—96.21 3 Claims




1. An optical fiber termination for a single optical fiber cable comprising:
- a set of at least three cylinders closely packed side-by-side to provide at least one interstitial aperture therebetween;
- said cylinders terminating in a mating end face;
- a single optical fiber individually inserted into said aperture from the rear of said cylinders and extending forwardly to a position adjacent to said mating end face;
- said fiber being positioned in the center of said aperture by three additional cylinders spaced from each other and each of which abuts against two of said first-mentioned cylinders and said fiber; and
- said additional cylinders all having the same diameter, said diameter being less than that of each said cylinder of said set.

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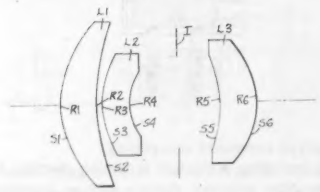
## 4,109,995
## TRIPLET WITH ASPHERIC SURFACES

Ellis I. Betensky, Toronto, Canada, assignor to Opcon Associates of Canada, Ltd., Toronto, Canada

Filed Jun. 3, 1976, Ser. No. 692,551
Int. Cl.[2] G02B 9/16, 3/02
U.S. Cl. 350—189 22 Claims




1. A lens consisting of first, second and third elements, said first and third elements being meniscuses of positive power with facing concave surfaces, said second element being a meniscus of negative power between said first and third elements, an aperture defining means between the concave surface of said second element and the concave surface of one of said other elements, the elements commencing with the positive element removed from the aperture defining means have equivalent focal lengths F1, F2 and F3, and:

$$F_o > F_1$$

$$F_o > |F_2|$$

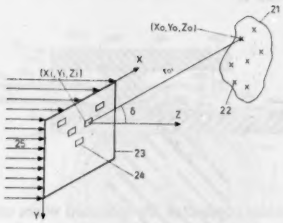
$$0.5F_o \leqq F_3 \leqq 2.1F_o$$

where $F_o$ is the equivalent focal length of the overall lens.

## 4,109,996
## METHOD FOR PRODUCING A SYNTHETIC HOLOGRAM

Kadri Okan Ersoy, Li, Norway, assignor to Sentralinstitutt for Industriell Forskning, Oslo, Norway

Filed Jun. 3, 1976, Ser. No. 692,576
Claims priority, application Norway, Jun. 3, 1975, 751942
Int. Cl.[2] G02B 27/00
U.S. Cl. 350—3.66 2 Claims




1. A method for directing a recording device to produce a synthetic hologram comprised of a plurality of quantized hologram spots in a modulating medium, said quantized hologram spots representing points on a wavefront defined by a plurality of geometrical points in space, said method comprising:
- selecting a point of said wavefront to be represented in said modulating medium;
- arbitrarily selecting positions for a number of quantized hologram spots allocated for the selected point of said wavefront to be represented in said hologram;
- determining the number of hologram spots for the selected point to be proportional to the wave amplitude at the point;
- adjusting the arbitrarily selected position of each of said hologram spots such that the length of the radius vector from the selected point to the center of the spot in its adjusted position satisfies the equation:

$$r_{oi} = n\lambda + (\phi - \phi_R)(\lambda/2\pi)$$

in which
- $r_{oi}$ is the radius vector length
- $n$ is an integer
- $\phi$ is the phase at the geometrical point,
- $\phi_R$ is the phase of the reference wave at the center of said hologram spot, and
- $\lambda$ is the wavelength; and
- driving said recording device to expose said modulating medium according to the determined number of hologram spots and the adjusted positions thereof.

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## 4,109,997
## OPTICAL SLIPRINGS

Myren L. Iverson, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

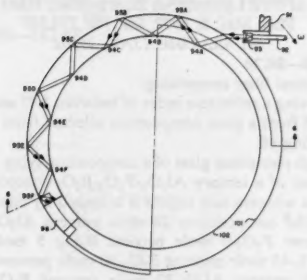
Division of Ser. No. 663,889, Mar. 4, 1976, Pat. No. 4,027,945.
This application Feb. 28, 1977, Ser. No. 772,395
Int. Cl.[2] G02B 23/02, 5/14
U.S. Cl. 350—23 8 Claims

1. An apparatus for transferring light signals between a first body and a second body, wherein said second body is mounted for rotation about an axis, and said first body is mounted to be stationary relative to said axis, comprising:
- a first light carrying member attached to said first body;
- a second light carrying member attached to said second body, wherein said second light carrying member has a toroidal shape, an annular central cavity, at least one reflective surface within said annular central cavity defin-

ing concentric annular mirrors, and at least one annular transparent window;

means attached to said first body for projecting a light signal from said first light carrying member through said transparent window to the annular central cavity of said second light carrying member; and

means attached to said second body for removing a light signal from said second light carrying member.



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**4,109,998**

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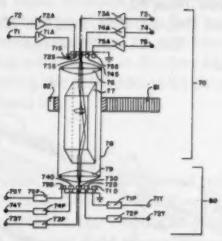
**Division of Ser. No. 663,889, Mar. 4, 1976, Pat. No. 4,027,945. This application Feb. 28, 1977, Ser. No. 772,396**

**Int. Cl.[2] G02B *23/02***

**U.S. Cl. 350—23** **6 Claims**



1. Apparatus for communicating a plurality of separate signals between a first body and a second body wherein one of said bodies is mounted for rotation about an axis relative to the other body, comprising:

a plurality of independent signal responsive light sources arranged in a fixed array and attached to one of said bodies, wherein each separate source is configured to emit a separate light signal in response to a separate electrical input signal;

first focusing means positioned to receive said separate light signals for projecting said separate light signals in the form of a plurality of separate beams;

a derotating prism positioned in the path of said separate beams and mounted for rotation about said axis relative to each of said first and second bodies at a rate equal to one-half the relative rotational rate between said first and second bodies for derotating said beams;

second focusing means positioned to receive said derotated beams for projecting said plurality of separate beams in the form of a plurality of separate corresponding images; and

a corresponding plurality of light responsive electrical transducers, each attached to the other of said bodies and positioned to receive a preselected one of said plurality of separate images, and each transducer being configured to emit an electrical output signal in response to actuation by a light signal in the form of a lighted preselected corresponding image.

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**4,109,999**

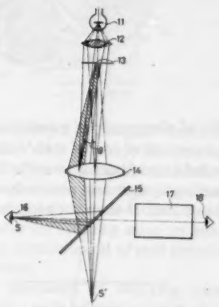
**ILLUMINATING DEVICE FOR SLIT LAMP MICROSCOPES**

**Yutaka Kiyono; Shigeaki Nagata; Shuichiro Shigemori; Tadashi Kishimoto, all of Tokyo; Sadao Maruyama, Koshigaya, and Katsuyoshi Arisawa, Tokyo, all of Japan, assignors to Mamiya Camera Co., Ltd., Japan**

**Filed Nov. 1, 1976, Ser. No. 737,796**

**Int. Cl.[2] G02B *21/06***

**U.S. Cl. 350—91** **17 Claims**



1. An illuminating device for slit lamp microscopes comprising a light source, a slit provided in front of said light source, an objective which is provided in front of said slit and can produce the image of said slit on an object to examined, a first reflector which is provided in front of said objective and is arranged diagonally to the optical axis of said objective and can direct rays from said objective to said object to be examined, said objective comprising a first lens group arranged near said first reflector and consisting of at least three groups including at least one convex lens of a $\nu$ -value of more than 45 and a second lens group formed as at least one concave lens arranged in a position separated by more than 1/5 the distance between said slit and said first lens group from the surface nearest to said slit of said first lens group between said slit and first lens group, a condenser lens which is provided between said light source and slit and can produce the image of said light source near either one of said objective and reflector, and a means for inclining the rays incident upon said objective from said light source through said condenser lens and slit with respect to the optical axis of said objective, said rays being able to be incident upon said object to be examined diagonally from above or below through said first reflector.

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**4,110,000**

**FIBER OPTIC CONNECTOR**

**Jerry Hench Bogar, and Tore Rudolf Johnson, both of Harrisburg, Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed Mar. 1, 1976, Ser. No. 662,294**

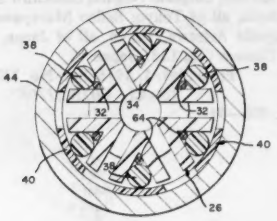
**Int. Cl.[2] G02B *5/14***

**U.S. Cl. 350—96.21** **11 Claims**

1. A fiber optic connector having mating plug and receptacle members for detachably joining fiber optics cables having a plurality of optical fibers, with said fibers mating on a one-to-one basis, each said member comprising:

a spreader member adapted to receive the fibers of the bundle in a closely bunched alignment at a first end of the member and cause them to diverge to a spread configuration at the opposite end of the member with said fibers generally defining a cone;

a fiber support member including a body having a first end matable with the opposite end of said spreader member and a second end defined by a like plurality of resilient cantilever arms with a like plurality of V-shaped channels extending longitudinally along said fiber support member and adapted to receive therein a fiber from said spreader member;




a like plurality of elongated pin members each lying longitudinally in a respective one of said V-shaped channels and adapted to hold said fibers against the bottom thereof; and

cam means acting against said pins to bias them against said fibers and into said V-shaped channels.

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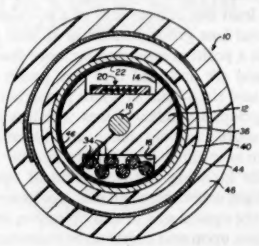
**4,110,001**

## OPTICAL FIBER CABLE CONSTRUCTION

**Jerzy A. Olszewski, Edison, and Arnab Sarkar, Fords, both of N.J., assignors to General Cable Corporation, Greenwich, Conn.**

**Filed Jan. 5, 1977, Ser. No. 756,979**
**Int. Cl.[2] G02B 5/16**
**U.S. Cl. 350—96.23** **18 Claims**




1. An optical fiber cable including in combination an axially extending core element having a channel in the perimeter surface thereof, said channel following a generally helical path along the length of the cable, a fiber assembly including a tape having an inner face confronting a bottom surface of the channel nearest to axis of the core and resting on said bottom surface of the channel along part of the length of the cable, and a fiber carried by the tape and adhered to the surface of the tape that faces away from the bottom of the channel, the fiber being spaced from the bottom of the channel by the thickness of the tape, the radial depth of the channel being enough greater than the thickness of the fiber assembly to prevent the fiber assembly from reaching to the top of the channel, as the result of any bending of the cable, and also to prevent compressing the optical fiber against any structure of the cable extending across the top of said channel.

**4,110,002**

## OPTICAL FIBERS FORMED OF ALUMINUM BOROPHOSPHATE GLASS COMPOSITIONS

**Richard M. Klein, Framingham; Carr Lane W. Quackenbush, Lexington, and Andrew G. Kolbeck, Beverly, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.**

**Filed Mar. 2, 1977, Ser. No. 773,527**
**Int. Cl.[2] C03C 13/00, 25/02**
**U.S. Cl. 350—96.29** **7 Claims**

1. An optical fiber comprising:

a core having a refractive index of between 1.47 and 1.58 and formed from a glass composition selected from the group consisting of:

a. a high phosphate glass of a composition lying within the region of a ternary $Al_2O_3$-$P_2O_5$-$B_2O_3$ composition diagram wherein said region is bounded by lines connecting the compositions 28 mole percent $Al_2O_3$-72 mole percent $P_2O_5$-0 mole percent $B_2O_3$; 5 mole percent $Al_2O_3$-45 mole percent $P_2O_5$-50 mole percent $B_2O_3$; 10 mole percent $Al_2O_3$-30 mole percent $P_2O_5$-60 mole percent $B_2O_3$; and 42 mole percent $Al_2O_3$-58 mole percent $P_2O_5$-0 mole percent $B_2O_3$, and

b. a low phosphate glass of a composition lying within the region of a ternary $Al_2O_3$-$P_2O_5$-$B_2O_3$ composition diagram wherein said region is bounded by the isocomposition lines 2 and 18 mole percent $P_2O_5$, 30 and 70 mole percent $Al_2O_3$, and 20 and 60 mole percent $B_2O_3$; and

a cladding formed from a glass composition selected from the group consisting of said high phosphate glass and said low phosphate glass and having a refractive index at least 0.007 less than that of the central portion of the core.

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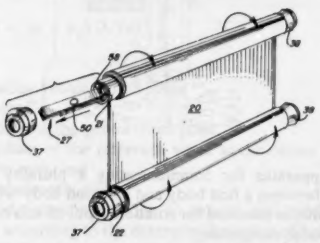
**4,110,003**

## PORTABLE MOVIE SCREEN DEVICE

**Robert W. Zinn, Addison, Ill., assignor to Knox Manufacturing Company, Wood Dale, Ill.**

**Filed Dec. 27, 1975, Ser. No. 754,889**
**Int. Cl.[2] G03B 21/56**
**U.S. Cl. 350—117** **11 Claims**



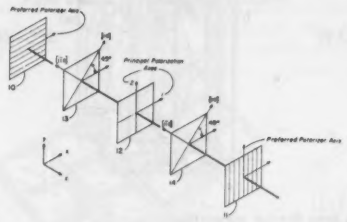

1. A portable movie screen device, comprising: a flexible screen for viewing a projected image; a first elongate stiffening member and a second elongate stiffening member each secured to an opposite marginal edge portion of said screen, the screen being rolled upon one of the stiffening members in closed storage position and extending in planar fashion between the members in open viewing position; a pair of elongate resilient tension elements having interengaging means on adjacent inner end portions for releasably holding said tension elements in aligned extended position, disengagement of the interengaging means permitting said tension elements to be placed in juxtaposed collapsed position; anchoring means in the midportion of each stiffening member spaced to receive the opposite outer end portions of each resilient tension element when the tension elements are flexed and bowed to tensioning position, the resiliency of said tension elements urging the stiffening members in opposite directions to stretch the screen tautly therebetween; and support means for holding the screen upright on a surface when stretched between the stiffening members.

4,110,004

## COMPLEX PHOTODICHROIC SPATIAL FILTER

Richard P. Bocker, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 12, 1977, Ser. No. 758,624
Int. Cl.² G02B 5/20
U.S. Cl. 350—162 SF 7 Claims



1. A complex spatial filter for reversibly recording a filter function $F(x,y)$ having a real component $F_r(x,y)$ and an imaginary component $F_i(x,y)$ and contained in the information in a beam of coherent light energy comprising:

a first linear polarizer positioned to receive said beam of coherent light for transmitting only its light energy components of predetermined polarization;

a first dichroic crystal plate positioned contiguous and parallel to said first linear polarizer and responsive to the absorption of light energy of a known first bandwidth and a first determinable polarization of said beam of coherent light for causing a difference in the fraction of its M-centers oriented along the [110] and [110] directions at each point $(x,y)$ defined by

$$f_1(x,y) - f_2(x,y) = (\tfrac{1}{4}k)$$

a quarter waveplate element positioned contiguous and parallel to said first dichroic crystal plate for causing a 90° phase change between the two orthogonally polarized components of coherent light energy emerging from said first dichroic crystal plate;

a second dichroic crystal plate positioned contiguous and parallel to said quarter waveplate elcment and responsive to the absorption of light energy of said known first bandwidth and a second determinable polarization of said beam of coherent light for causing a difference in the fraction of its M-centers oriented along the [110] and [110] directions at each point $(x,y)$ defined by

$$f_1'(x,y) - f_2'(x,y) = (\tfrac{1}{4}k)$$

where $k$ is a real positive constant of proportionality,

said first and second dichroic crystal plates having their principal polarization axes oriented at 45° relative to the principal polarization axis of said quarter waveplate element;

a second linear polarizer positioned contiguous and parallel to said second dichroic crystal plate for transmitting light energy components orthogonally polarized relative to said components of predetermined polarization; and

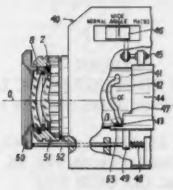
a source of light energy of said known first bandwidth and non-polarized state disposed to irradiate said first and second dichroic crystal plates for restoring their M-centers to substantially random orientation.

4,110,005

## WIDE-ANGLE ATTACHMENT FOR VARIFOCAL OBJECTIVE

Kurt Böhm, Vienna; Leopold Rollenitz, Totzenbach, both of Austria, and Francois Laurent, Yverdon, Switzerland, assignors to Bolex International SA, Ste-Croix, Switzerland

Filed Aug. 5, 1976, Ser. No. 711,835
Claims priority, application Austria, Aug. 6, 1975, 6079/75
Int. Cl.² G02B 15/18, 7/02
U.S. Cl. 350—184 8 Claims



1. In a camera including a housing, a varifocal objective in said housing provided with movable lens means and with a control element for displacing said movable lens means from a normal operating range into a macro position, and supplemental lens means emplaceable on a seat formed by said housing in line with said objective for focusing same on nearby objects in a closeup range upon displacement of said movable lens means into said macro position,

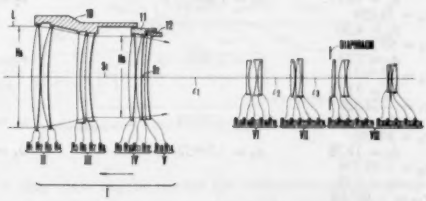
the combination therewith of blocking means normally extending into the path of said control element for preventing the displacement of said movable lens means into said macro position, and a contact member on said housing coupled with said blocking means and engageable by said supplemental lens means upon emplacement thereof on said seat for removing said blocking means from the path of said control element.

4,110,006

## TELEPHOTO TYPE ZOOM LENS

Keiji Ikemori, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 2, 1977, Ser. No. 773,667
Claims priority, application Japan, Mar. 11, 1976, 51/26580
Int. Cl.² G02B 15/18
U.S. Cl. 350—186 12 Claims



1. A telephoto zoom lens comprising:

a convergent front lens group, a zooming lens part and an image forming lens group positioned in said order from an object side, wherein said convergent front lens group consists of a convergent first sub-group, a divergent second sub-group, a convergent third sub-group and a divergent fourth sub-group, further wherein said convergent third sub-group can be shifted for focusing and the ratio between the focal length ($f_{II}$) of said convergent first sub-group and the absolute value ($|f_{III}|$) of the focal length of said divergent second sub-group lies between 1 : 0.65 and 1 : 0.9, and the absolute value ($|f_{IV}|$) of the focal length of said divergent fourth sub-group is greater than the focal length ($f_{III}$) of said convergent third sub-group,

said zooming lens part consisting of at least two movable lens groups.

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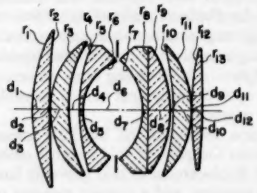
**4,110,007**

## LARGE APERTURE PHOTOGRAPHIC LENS SYSTEM

**Yoshitsugi Ikeda, Hachiouji, Japan, assignor to Olympus Optical Co., Ltd., Japan**

**Filed Feb. 23, 1976, Ser. No. 660,119**
**Claims priority, application Japan, Feb. 25, 1975, 50/23204**
**Int. Cl.² G02B 9/62**
**U.S. Cl. 350—215** **5 Claims**



1. A large-aperture photographic lens system comprising a first positive meniscus lens component, a second positive meniscus lens component, a third negative meniscus lens component, a fourth cemented doublet lens component, a fifth positive meniscus lens component and a sixth positive lens component having the following numerical data:

| | | | |
|---|---|---|---|
| f = 100, F/1.2, | 2ω = 43° | $f_B$ = 69.71 | |
| $r_1$ = 89.502 | | | |
| $d_1$ = 10.04 | $n_1$ = 1.8061 | | $\nu_1$ = 40.9 |
| $r_2$ = 402.60 | | | |
| $d_2$ = 0.23 | | | |
| $r_3$ = 46.938 | | | |
| $d_3$ = 10.57 | $n_2$ = 1.8061 | | $\nu_2$ = 40.9 |
| $r_4$ = 78.859 | | | |
| $d_4$ = 4.30 | | | |
| $r_5$ = 95.186 | | | |
| $d_5$ = 2.64 | $n_3$ = 1.7847 | | $\nu_3$ = 26.2 |
| $r_6$ = 30.963 | | | |
| $d_6$ = 33.58 | | | |
| $r_7$ = −34.820 | | | |
| $d_7$ = 2.20 | $n_4$ = 1.78472 | | $\nu_4$ = 25.7 |
| $r_8$ = 892.90 | | | |
| $d_8$ = 12.78 | $n_5$ = 1.79952 | | $\nu_5$ = 42.2 |
| $r_9$ = −59.776 | | | |
| $d_9$ = 0.18 | | | |
| $r_{10}$ = −147.16 | | | |
| $d_{10}$ = 10.39 | $n_6$ = 1.7859 | | $\nu_6$ = 44.1 |
| $r_{11}$ = −55.823 | | | |
| $d_{11}$ = 0.23 | | | |
| $r_{12}$ = 169.635 | | | |
| $d_{12}$ = 6.16 | $n_7$ = 1.7859 | | $\nu_7$ = 44.1 |
| $r_{13}$ = −395.38 | | | |

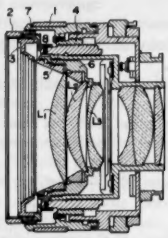
wherein the symbols $r_1$ through $r_{13}$ represent radii of curvature of the surfaces of the respective lenses, $d_1$ through $d_{12}$ designate thicknesses of the respective lenses and airspaces there between, $n_1$ through $n_7$ denote refractive indicies of the respective lenses, $\nu_1$ through $\nu_7$ represent Abbe's numbers of the respective lenses, $f$ is the overall focal length of the lens system, $2w$ is the angular field of view, F is the aperture, and fB is the back focal length.

**4,110,008**

## CUSHIONED OBJECTIVE LENS

**Kyozo Uesugi, Izumi; Tsuneyo Metabi, and Ryuzo Hachiken, both of Sakai, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Feb. 22, 1977, Ser. No. 770,959**
**Claims priority, application Japan, Mar. 2, 1976, 51-22806**
**Int. Cl.² G02B 7/02**
**U.S. Cl. 350—255** **13 Claims**



1. A lens device comprising:
a lens barrel;
a lens unit disposed within said lens barrel;
an external component including a barrel head sleeve disposed at a forwardmost portion of said lens barrel and exposed to the exterior of said lens barrel so as to receive an impact applied from the front of said lens barrel;
an internal mechanism disposed between said lens unit and said external component; and
a buffer coupled to and interposed between said barrel head sleeve and said internal mechanism.

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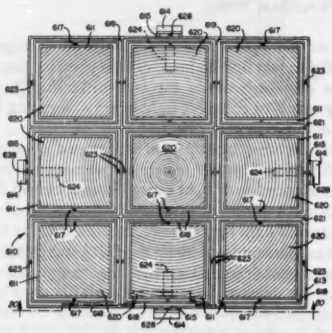
**4,110,009**

## HELIOSTAT APPARATUS

**Jesse C. Bunch, 1008 Kerwin Rd., Silver Spring, Md. 20901**

**Filed Dec. 19, 1975, Ser. No. 642,473**
**Int. Cl.² G02B 5/08**
**U.S. Cl. 350—292** **5 Claims**



1. Heliostat apparatus for concentrating solar energy comprising support means disposed in a first plane and supporting a plurality of mirror units having freedom of substantial universal articulation thereon,
each of said plurality of mirror units carrying at an upper portion thereof reflective means trained to receive incident rays of the sun and to maintain reflection thereof in a desired substantially fixed direction,
adjustment means operatively connected to said plurality of mirror units and disposed in a plane generally parallel to said first plane in which said support means are disposed, said adjustment means being shiftable in linear displacement to additional planes adjacent and generally parallel

thereto to effect substantially universal displacement of each of said mirror units responsive to said linear displacement of said adjustment means at said support means thereby conjointly retrain the reflective means of each of said mirror units to receive incident rays of the sun and maintain reflection thereof in said substantially fixed direction over the course of any day.

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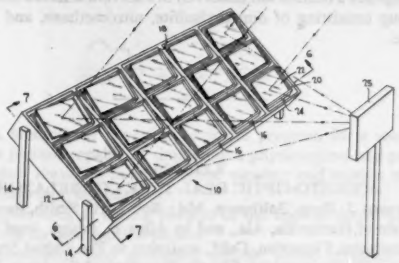
**4,110,010**

## GANGED HELIOSTAT

**Richard D. Hilton, Rte. 2, Box 381-A, King George, Va. 22485**

**Filed Jul. 7, 1977, Ser. No. 813,658**
**Int. Cl.[2] G02B *5/08, 7/18***
**U.S. Cl. 350—292** **10 Claims**



1. A device adapted for tracking the apparent motion of the sun and reflecting and thereby concentrating rays of the sun to a fixed target area comprising at least two members each having a reflective surface and being rotatably mounted in a frame on an axis which passes through the center point of the member, each frame being rotatably mounted in a common support on an axis which passes through the center point of the member and which is at a right angle to the axis of the member, a control rod having a longitudinal axis attached to the member such that the axis of the rod is normal to the reflective surface and passes through the center point of the member, guide frame means in engagement with each control rod, driving means for moving the guide frame such that each member rotates about one axis and adjusting means for moving the guide frame means such that each member rotates about the other axis.

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**4,110,011**

## PERISCOPE CONSTRUCTION

**Gerald Tausch, Salem, Ohio, assignor to Miller-Holzwarth, Inc., Salem, Ohio**

**Filed Feb. 22, 1977, Ser. No. 770,641**
**Int. Cl.[2] G02B *5/08***
**U.S. Cl. 350—301** **7 Claims**

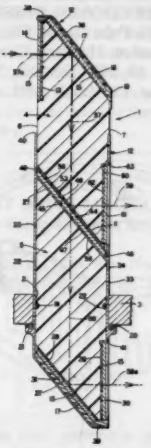
1. A periscope construction of the type having a protective housing with at least front and rear walls, and an optical system mounted within the housing, in which the optical system includes:

(a) a first block of optical material having an object viewing surface, a first reflective surface, a first eyepiece viewing surface, and a first end surface;

(b) a second block of optical material having a second eyepiece viewing surface, a second reflective surface, and a second end surface;

(c) the first and second blocks of optical material being mounted at and bonded to generally opposite ends of the protective housing and forming a parallelogram in cross section with the first and second reflective surfaces and the object and second eyepiece viewing surfaces, respectively, being generally parallel with respect to each other, and with the first and second end surfaces being spaced from each other and forming a void therebetween;

(d) beam splitting means mounted within the void between the first and second end surfaces of the first and second blocks, with said beam splitting means reflecting a predetermined portion of a light beam entering the housing through the object viewing surface and reflected from the first reflective surface out of the housing means through the first eyepiece viewing surface, with a remaining unreflected portion of the light beam passing through said



beam splitting means and being reflected from the second reflective surface out of the housing means through the second eyepiece viewing surface; and

(e) optical adhesive means bonding the beam splitting means to the first and second end surfaces of the blocks to form an integrally joined compact optical system mounted within and bonded to the protective housing.

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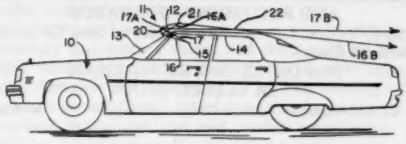
**4,110,012**

## REAR VIEW MIRROR SYSTEM WITH ELLIPTICALLY CURVED MIRROR AND FLAT MIRROR

**Kenneth W. Jarvis, 5900 Columbus Ave. South, Minneapolis, Minn. 55417**

**Filed Aug. 11, 1977, Ser. No. 823,718**
**Int. Cl.[2] G02B *5/08***
**U.S. Cl. 350—302** **23 Claims**



1. A rear view mirror system for vehicles comprising support means mounted on the exterior of the vehicle above the upper edge of the windshield, said mirror system including a first generally elliptically curved mirror surface mounted by said support means at a location generally above the roof line of the vehicle, said curved mirror surface being curved in fore and aft direction and downwardly concave, and a second substantially flat mirror mounted by said support means below and forwardly of said elliptically curved mirror surface, said second substantially flat mirror being visible by a driver of the vehicle and positioned so that a line of sight reflected from the lower portion of the substantially flat mirror is reflected to an upper and rearwardly positioned portion of the elliptically curved mirror surface, and a line of sight reflected from the upper portion of the substantially flat mirror is reflected to the most forwardly portion of the elliptically curved mirror to

provide a properly oriented image for a viewer to the rear and below the substantially flat mirror.

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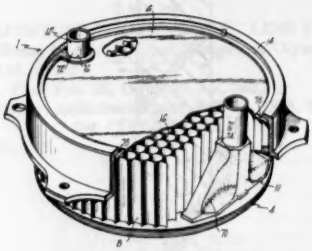
**4,110,013**

## LIGHTWEIGHT COOLED LASER MIRROR

**Fredrick G. Eitel, North Palm Beach, Fla., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed Apr. 13, 1977, Ser. No. 787,243**
**Int. Cl.² G02B 5/08**
**U.S. Cl. 350—310** **5 Claims**



1. In combination in a coolant laser mirror, a face plate assembly, a rear closure plate, metal substrate fixed between said face plate assembly and closure plate, said metal substrate being comprised of a lightweight metal core, spaces being located between said face plate assembly and closure plate at opposite sides thereof, manifold means connected between said closure plate and face plate assembly, passageway means through said manifold means connecting the exterior of said laser mirror to said face plate assembly, said face plate assembly being of a sandwich construction having a plurality of plates, including a last plate, said last plate having a reflecting surface thereon for use in a laser device, said plates permitting many passes of a coolant fluid through the face plate assembly.

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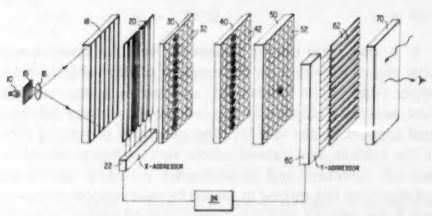
**4,110,014**

## PARALLEL AND SERIES ELECTRO-OPTIC VIEWING AND RECORDING APPARATUS

**George J. Yevick, Leonia, N.J., assignor to Izon Corporation, Stamford, Conn.**

**Filed Oct. 22, 1976, Ser. No. 735,030**
**Int. Cl.² G02F 1/13**
**U.S. Cl. 350—342** **34 Claims**



1. An electro-optic device of the type having a photoconductive sheet and an electro-optic sheet both generally planar, the improvement comprising, generally planar X and Y sets of transparent and conductive addressor strips, the X and Y sets sandwiching the photoconductive sheet and the electro-optic sheet.

**4,110,015**

## ELECTROLYTES FOR USE IN ELECTROCHROMIC DEVICES

**Thomas B. Reddy, Pound Ridge, N.Y., assignor to American Cyanamid Company, Stamford, Conn.**

**Filed May 25, 1977, Ser. No. 800,362**
**Int. Cl.² G02F 1/36**
**U.S. Cl. 350—357** **7 Claims**

1. In an electrochromic device which comprises a layer of persistent electrochromic material on an electrode surface in contact with an electrolyte solution, a counter-electrode also contacting said solution and electrical means for selectively applying electrical fields of opposite polarity across said electrodes, the improvement wherein said electrolyte solution comprises a lithium salt dissolved in a solvent selected from the group consisting of dimethylsulfite, nitromethane, and sulfolane.

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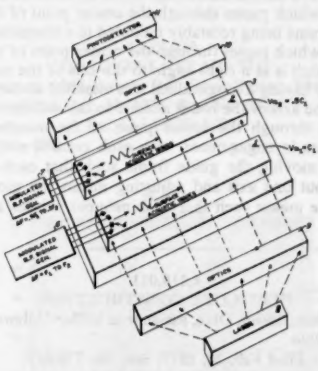
**4,110,016**

## ACOUSTO-OPTIC REAL TIME CORRELATOR

**Norman J. Berg, Baltimore, Md.; Bob Lorin Smith, deceased, late of Huntsville, Ala., and by Allen B. Adams, legal representative, Cupertino, Calif., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Jun. 7, 1977, Ser. No. 804,203**
**Int. Cl.² H03H 9/26**
**U.S. Cl. 350—358** **5 Claims**



1. An acousto-optic apparatus for providing the correlation of first and second electrical signals without the necessity of time inversion, comprising

first and second acousto-optic interaction media disposed adjacent each other, said second interaction medium having a lower acoustic velocity than said first medium, each of said media having an acoustic transducer means disposed thereon,

means for applying a high frequency A.C. signal to said transducer means on said first medium, the envelope of which corresponds to said first electrical signal,

means for applying a high frequency A.C. signal to said transducer means on said second medium, the envelope of which corresponds to said second electrical signal,

laser means directed to transmit a laser beam across both said media, and

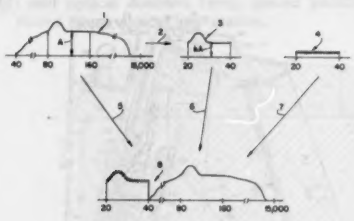
detector means for detecting said laser beam after it traverses said first and second acousto-optic interaction media.

## 4,110,017

## LOW-FREQUENCY SOUND PROGRAM GENERATION

Thomas L. McCormack, Arleta, and Albert P. Green, Los Angeles, both of Calif., assignors to Warner Bros. Inc., Burbank, Calif.

Filed Jun. 3, 1977, Ser. No. 803,212
Int. Cl.[2] G03B *31/00*
U.S. Cl. 352—5 14 Claims



1. A method for producing a sound program for a sound motion picture capable of simulating a physiological and psychological sensation in an audience viewing said motion picture comprising the steps of:

(a) generating at least a portion of the audible sound program for said motion picture,

(b) processing said generated audible sound program to produce a low-frequency sound program capable, during subsequent synchronous playback with the projection of said motion picture, for simulating said physiological and psychological sensation, and

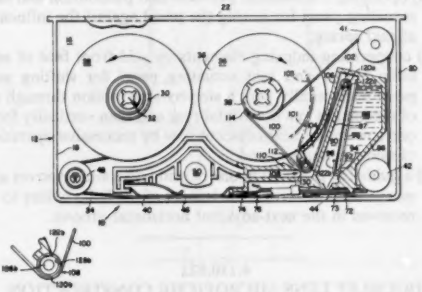
(c) recording synchronously said generated audible sound program and said produced low-frequency sound program for subsequent playback synchronously with the projection of said motion picture.

## 4,110,018

## PULL STRIP GUIDE FOR MULTIPURPOSE FILM CASSETTES

Fred M. Finnemore, North Reading, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Apr. 26, 1977, Ser. No. 791,035
Int. Cl.[2] G03C *11/00*
U.S. Cl. 352—130 10 Claims



1. A film cassette containing a strip of photographic film to be exposed and processed without removal from the cassette, comprising:

a housing;

means contained within said housing for processing the exposed film strip, said processing means including a processing fluid reservoir initially sealed by a tear tab closure to be removed by advancement of the tear tab upon completion of film exposure to release reservoir contained processing fluid for deposit on the film strip;

a pull strip joined at one end to said tear tab; and

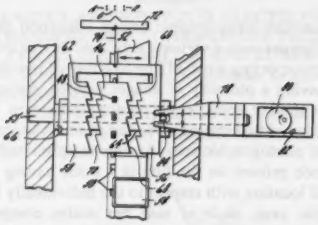
means for guiding said pull strip along a predetermined path to advance said tear tab and release the processing fluid from said reservoir, said guiding means including at least one turning point and means for supporting the inner surface of said pull strip at said turning point, said supporting means comprising a cylindrical element having a first arcuate portion of its outer surface in contact with said inner surface of said pull strip and means for contacting and supporting at least the arcuate portion of said outer surface of said cylindrical element diametrically opposed from said first arcuate portion for rotational movement of said cylindrical element relative thereto as said pull strip is advanced thereby.

## 4,110,019

## INTERMITTENT DRIVE MECHANISM FOR FILM

Marcel Jules Helene Staar, Brussels, Belgium, assignor to Staar S.A., Belgium

Filed Jun. 1, 1976, Ser. No. 691,605
Claims priority, application Belgium, Jun. 5, 1975, 829918
Int. Cl.[2] G03B *1/24*
U.S. Cl. 352—188 7 Claims



1. In an intermittent drive mechanism for film,

a driven ratchet wheel having a ring of ratchet teeth on one face,

exterior sprocket teeth carried by said ratchet wheel and engageable in perforations in film to move said film when said wheel is turned,

a driving wheel having a ring of teeth on one face,

a shaft for supporting said driving wheel and said ratchet wheel face to face and to turn about the axis of said shaft,

means for resiliently urging said wheel axially toward each other and said teeth into contact,

said teeth on both said sheels having asymmetrical complementary saw-toothed shape, said teeth meshing to turn said ratchet wheel when said driving wheel is turned in one direction and ratcheting to lift said driving wheel away from said ratchet wheel against the resistance of said resilient means and idle said ratchet wheel when said driving wheel is turned in the other direction,

an arm supported for swinging movement on said shaft and connected to turn said driving wheel,

and rotary cam means for oscillating said arm and for turning said driving wheel first in one direction and then in the other at a constant frequency and amplitude, the amplitude of the oscillations of said arm and the turning movements of said driving wheel being equal to the pitch of said teeth and the distance between said film perforations so that said driving wheel turns said ratchet wheel and moves said film the pitch distance upon each oscillation of said arm,

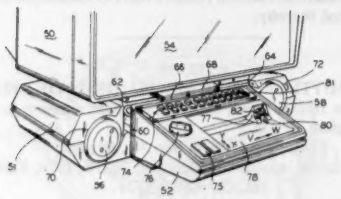
said ratchet wheel having a series of indentations adjacent said sprocket teeth, and

a pawl engageable in said indentations for holding said ratchet wheel idle during the ratcheting of said driving wheel and released from said indentations when said driving wheel is turned in said one direction to turn said ratchet wheel and move said film.

## 4,110,020
## ELECTRONICALLY CONTROLLED MICROFILM PHOTOGRAPHIC IMAGE UTILIZATION DEVICE

Delmar R. Johnson; John R. Flint, both of Barrington; Thomas R. Wells, Des Plaines; Rolf B. Erikson, Lincolnwood, and Bruce A. Rady, Palatine, all of Ill., assignors to Bell & Howell Company, Chicago, Ill.

Filed Aug. 3, 1976, Ser. No. 711,180
Int. Cl.[2] G03B *23/12, 23/08;* G06K *7/10, 19/00*
U.S. Cl. 353—26 A 25 Claims



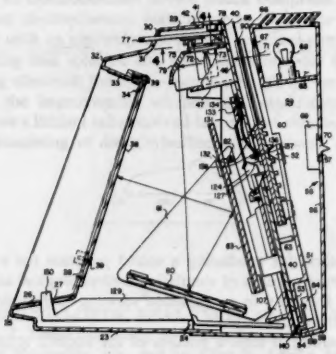
1. A microfilm photographic image utilization device for projecting images onto a viewing area, said device comprising means for transporting a roll of film in either of two directions, said film having a plurality of images printed thereon in discrete photographic areas, each photographic area having a plurality of individual images arranged in an orthogonal array, each of said photographic areas having an individually associated bar code printed on the film at a point having a precise geometrical location with respect to the individually identified photographic area, each of said bar codes comprising an aligned series of wide and narrow marks separated by spaces, each narrow mark having the same width, each of said wide marks being twice as wide as said narrow marks, the width of each of said spaces being equal to the width of said narrow marks, two sensors means for reading said aligned series of marks, said sensor means being separated by a distance equal to one-and-one-half times the width of said narrow marks, control means for selecting said one photographic area responsive to movement of at least one control switch to issue a command code, means responsive to said command code for starting said transport means in search of one of said bar codes corresponding to said command code, means for automatically driving said transport to reel said film in either of said two directions to position a selected one of said photographic areas in a reading location, means for detecting whether said transport means is searching in the correct one of said two directions for said one bar code, means for reversing said transport means if said transport means detects bar codes which indicate that searching is in the incorrect one of said two directions, and means comprising a movable lens for projecting a selected image from the photographic area which is then positioned within said viewing area.

25. A bar code reading system comprising a web having a plurality of said bar codes formed thereon wherein each of a plurality of bar codes comprises an aligned series of wide and narrow marks separated by spaces, each narrow mark having the same width, each of said wide marks being twice as wide as said narrow marks, the width of each of said spaces being equal to the width of said narrow marks, sensor means comprising means for sequentially reading each of said aligned series of marks at each of two locations separated by a distance equal to one-and-one-half of said narrow marks, one of said reading locations acting as a strobe for the other of said locations, and means responsive to the strobing for indicating an encoded "1" or "0" depending upon the reading then being received at the strobed location.

## 4,110,021
## MICRO FICHE INDEXER

Jody L. Numbers, Scottsdale, Ariz., assignor to Ralph A. Sickles and Doris E. Sickles, both of Tempe, Ariz., Co-Trustees of the Ralph A. Sickles Family Estate

Filed Sep. 19, 1977, Ser. No. 834,391
Int. Cl.[2] G03B *23/08*
U.S. Cl. 353—27 R 14 Claims



1. In a micro fiche indexer for shifting a fiche having a plurality of images arranged in a plurality of vertically spaced horizontal rows:

(a) a cabinet having a screen mounted in the front thereof;
(b) a fiche holder in which a fiche is removably positioned and having front and rear faces;
(c) a plurality of horizontally ribs on said rear face defining horizontal grooves, said fiche holder being positioned in said cabinet opposite said screen;
(d) an optical system including an electric light, lenses and reflectors for projecting an enlarged image on the fiche onto said screen;
(e) a pushbutton mounted in the front portion of said cabinet;
(f) an actuating panel vertically movable in said cabinet and having a portion disposed in front of the front face of said fiche holder;
(g) a spring having one end connected to said cabinet and its other end to said actuating panel and biasing said panel into its lowermost position;
(h) operating connections between said pushbutton and said actuating panel for raising the panel against the influence of said spring;
(i) cooperating indexing elements on said front face of said fiche holder and said actuating panel for shifting said panel horizontally with a step-by-step motion through all of the images in a horizontal row and then vertically from one row to the next-adjacent row by successive operation of said pushbutton; and
(j) a guide bar received in one of said horizontal grooves and movable upon vertical movement of the fiche holder to be received in the next-adjacent horizontal groove.

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## 4,110,022
## DOUBLET LENS MICROFICHE CONSTRUCTION

George J. Yevick, Leonia, N.J., assignor to Izon Corporation, Stamford, Conn.

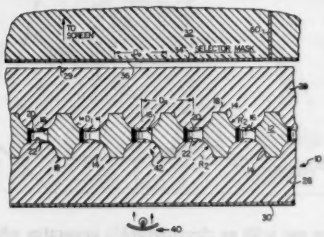
Filed Jan. 8, 1975, Ser. No. 539,458
Int. Cl.[2] G03B *21/11, 21/00*
U.S. Cl. 353—120 3 Claims

1. A microfiche adapted for use on a micro optical viewer, said microfiche including:

(a) two transparent sheets,
(b) one of said sheets carrying stored micro optical information distributed over its area,
(c) said sheets sandwiching an apertured opaque unitary

web, portions of said transparent sheets extending into each of the apertures of the opaque web from opposite sides of the web, said portions, for each aperture of said bed, being convex towards each other, said convex portions together with their corresponding areas on the sides of said transparent sheets, defining two optically aligned plano-convex lenses to thereby define an optical doublet for each aperture,

(d) said optical doublets being spaced parallel from said stored micro optical information,



(e) said micro optical information defined by a plurality of information sets, each information set corresponding to a unique macro scene, each information set occupying dispersed areas interlaced with but distinct from the dispersed areas occupied by any other information, each unique macro scene corresponding to a unique set of said optical doublets, each of the dispersed areas of an information set having its own optical doublet and being in optical correspondence therewith,

wherein said transparent sheets have different indices of refraction.

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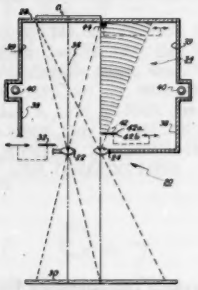
**4,110,023**

## OPTICAL SYSTEM FOR ALTERNATIVELY PROJECTING ADJACENT IMAGES OF ADJACENT OBJECTS OR DOUBLE IMAGES OF A SINGLE OBJECT

**Morton Silverberg, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Mar. 30, 1977, Ser. No. 782,864**
**Int. Cl.[2] G03B *21/00***
**U.S. Cl. 353—122** **1 Claim**



1. An optical system for alternatively projecting an image of a full object field in a first mode of operation and projecting a plurality of images of a partial object field in a second mode of operation, including:

an object station defining an object field, said object field disposed within an integrating illumination cavity defined by an enclosure having a diffuse reflective inner member an image station defining an image field

a first projection lens disposed on a first optical axis between said object and image stations;

said object and image fields being respectively in object and image conjugate relationship to said first projection lens p1 a second projection lens disposed on a second optical axis between said object and image stations

a first part of said object field and a first part of said image field being respectively in object and image conjugate relationship to said first projection lens

said first part of said object field and a second part of said image field being respectively in object and image conjugate relationship to said second projection lens

a shutter operatively disposed relative to said second projection lens to close optical communication through said second projection lens in said first mode of operation and to open optical communication through said second projection lens in said second mode of operation, and

a field stop operatively disposed in said object field and movable between a clear position to permit unobstructed optical communication between said object station and said image station in said first mode of operation and a masking position to mask out a second part of said object field in said second mode of operation, said field stop having a diffuse reflective surface on its object side and a matte black surface on its image side.

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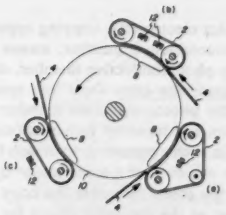
**4,110,024**

## TRANSFER ASSEMBLY FOR ELECTROSTATIC TRANSFER OF A TONER IMAGE FROM A CURVILINEAR RECORDING SURFACE

**Robert W. Gundlach, Victor, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed May 14, 1976, Ser. No. 686,353**
**Int. Cl.[2] G03G *15/00***
**U.S. Cl. 355—3 TR** **8 Claims**



1. In an electrostatographic copying system having means for forming a latent electrostatic image, means for development of said latent electrostatic image with electrostatically attractable developer material, and means for electrostatic transfer of the developed image of said developer materials from a curvilinear surface upon which the developed image is electrostatically adherent to a receiving sheet by applying transfer corona charges from a corona discharge device to the rear surface of the receiving sheet while the front surface of the receiving sheet is held in intimate engagement with said curvilinear surface over a transfer area thereof; the improvement comprising:

a highly corona pervious continuous web having a porosity of greater than 30%, the solid area of said web consisting of strand-like filamentous material in an open integral dimensionally stable open mesh configuration,

said filamentous material having a filament diameter of about 10 mills or less and a bulk resistivity of at least $10^6$ ohm-cm to allow a substantially uniform application of said transfer corona charges through said corona pervious web,

support means for arcuately deforming said corona pervious web over said transfer area of said curvilinear surface to hold a receiving sheet between said web and said transfer area of said curvilinear surface,

means for moving said corona pervious web in registration with the movement of said curvilinear surface, and

corona discharge means spaced from said curvilinear surface, with said corona pervious web interposed therebetween, for applying said transfer corona charges through the openings in said corona pervious web to the receiving sheet concurrently with the passage of the receiving sheet through the transfer area.

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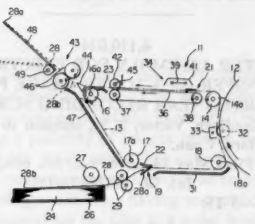
4,110,025

## DUPLEX ELECTROSTATIC COPYING MACHINE

Yasuhiro Tabata, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Sep. 15, 1976, Ser. No. 723,274
Claims priority, application Japan, Sep. 22, 1975, 50-114554
Int. Cl.[2] G03G *15/00*; G03B *27/32, 27/52*
U.S. Cl. 355—3 SH 8 Claims



1. In a duplex electrostatic copying apparatus comprising a moving photoconductive member, means for forming toner images on the photoconductive member, conveyor means for moving a rectangular copy sheet into synchronized engagement with the photoconductive member to transfer toner images thereto, and turnover means associated with the conveyor means in such a manner as to detach the copy sheet from the conveyor means after a toner image is formed on a front side of the copy sheet, turn over the copy sheet and reattach the copy sheet to the conveyor means for transfer of a toner image to a back side of the copy sheet, the improvement wherein the conveyor means comprises:

a moving endless chain; and

first and second spaced releasable clamps fixed to the chain for movement therewith, the first clamp clamping a first edge of the copy sheet to the chain to form the toner image on the front side of the copy sheet, the second clamp clamping a second edge of the copy sheet which is opposite to the first edge to the chain to form the toner image on the back side of the copy sheet;

the turnover means comprising:

actuator means having an actuator member engageable with the first and second clamps to cause the first clamp to release the first edge of the copy sheet to detach the copy sheet from the chain and the second clamp to clamp the second edge of the copy sheet to reattach the copy sheet to the chain; and

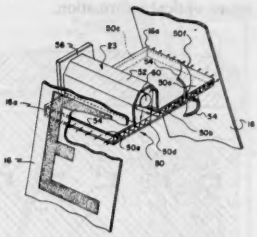
feed means to engage with and move the copy sheet, when the first clamp engages with the actuator member and is actuated thereby to release the first edge of the copy sheet, away from the chain to a position in which the second edge of the copy sheet is clear of the chain and to move the copy sheet back toward the chain when the second clamp engages with the actuator member so that the second edge of the copy sheet is clamped by the second clamp when the second clamp disengages from the actuator member.

4,110,026

## DISCHARGER APPARATUS FOR PHOTOCONDUCTORS

Ronald William Farley, and Donald Luke Smith, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 9, 1977, Ser. No. 776,081
Int. Cl.[2] G03B *27/00*
U.S. Cl. 355—3 R 8 Claims



1. For use with an electrographic apparatus which includes a charged photoconductor which is dischargable by light and is more sensitive to light in a first portion of the light spectrum than in a second portion of the light spectrum, discharging apparatus for efficiently discharging the charged photoconductor, comprising: a fluorescent concentrator for producing light which floods the photoconductor at a predetermined location and wherein such concentrator includes dye which produces light that has substantial components in the first portion of the light spectrum.

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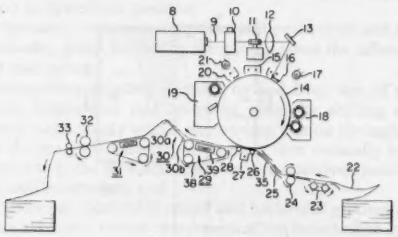
4,110,027

## IMAGE TRANSFER MECHANISM

Yasushi Sato, Kawasaki, and Hiroo Ichihashi, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 17, 1977, Ser. No. 807,741
Claims priority, application Japan, Jul. 12, 1976, 51-82643
Int. Cl.[2] G03B *15/00*
U.S. Cl. 355—3 TR 6 Claims



1. An image transfer mechanism for transferring the image on an image-bearing member onto a continuous transfer medium by bringing said transfer medium into contact with the image on said image-bearing member wherein said transfer medium is conveyed along a path past a transfer section, said mechanism comprising first conveyor means disposed upstream of the image transfer section in the transfer medium conveyance path for intermittently conveying the transfer medium at a constant velocity, second conveyor means disposed downstream of said image transfer section for conveying said transfer medium while slidably holding the non-image-bearing surface thereof, and image transfer means disposed at the image transfer section between said two conveyor means.

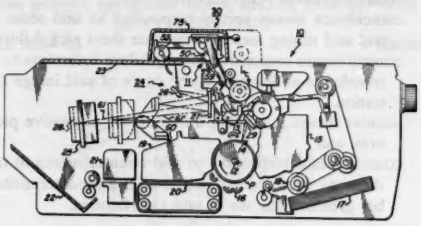
## 4,110,028
## DRIVE SYSTEM FOR MULTI-MODE REPRODUCING APPARATUS

**Louis Schneider, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Continuation-in-part of Ser. No. 601,553, Aug. 4, 1975, abandoned. This application Apr. 2, 1976, Ser. No. 673,228**

**Int. Cl.[2] G03G *15/28***

**U.S. Cl. 355—8** **27 Claims**



22. In a reproducing apparatus for producing copies of a document comprising:

a transparent viewing platen;

means for advancing said document selectively at one of a plurality of desired speeds, including a base speed, the improvement wherein said apparatus further includes:

means for supporting said document advancing means for movement between an operative position over said platen and a stored position away from said platen;

means for automatically conditioning said document advancing means to operate at said base speed after it has finished operation at a speed different from said base speed, said automatic conditioning means being responsive to the movement of said document advancing means between said positions.

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## 4,110,029
## LIQUID DEVELOPER FOR AN ELECTROSTATIC COPYING DEVICE

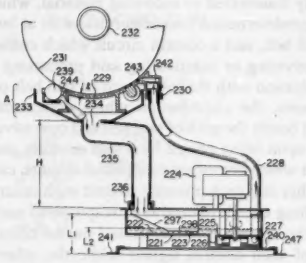
**Yoshitomo Goshima, Yokohama; Hiroyuki Hattori, Mitaka; Shiro Komaba, Kawasaki, and Kazumi Umezawa, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 509,744, Sep. 26, 1974, Pat. No. 3,957,368. This application Jun. 10, 1975, Ser. No. 585,602**

**Claims priority, application Japan, Sep. 27, 1973, 48-108677; Oct. 1, 1973, 48-111249; Nov. 30, 1973, 48-135155; Dec. 13, 1973, 48-140956; Jan. 8, 1974, 49-5503; Jan. 8, 1974, 49-5504; Feb. 12, 1974, 49-16988; Oct. 5, 1973, 48-116829[U]; Oct. 5, 1973, 48-116830[U]; Dec. 20, 1973, 48-146414[U]**

**Int. Cl.[2] G03G *15/10***

**U.S. Cl. 355—10** **16 Claims**



1. In a machine embodying a liquid developing device, the improvement comprising:

a member for bearing thereon a latent image;

means disposed in opposition to said image bearing member for applying developer liquid thereto;

a container disposed at a lower position than said developer liquid applying means for holding developer liquid to be applied to said latent image bearing member;

means for circulating the developer liquid from said container to said developer liquid applying means and back into said container; and

filter means disposed at a position where the developer liquid flows back into said container, said filter means having a developer liquid impinging portion which is angularly disposed with respect to said flow of the developer liquid and is disposed above the surface of the developer liquid contained in said container during the operation of said device, and a toner accumulating portion which is immersed in the developer liquid in said container at least when said pump means is not in operation to thereby soften and disperse any coagulated toner particles from the developer liquid accumulated thereon.

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## 4,110,030
## ELECTROSTATIC COPYING APPARATUS

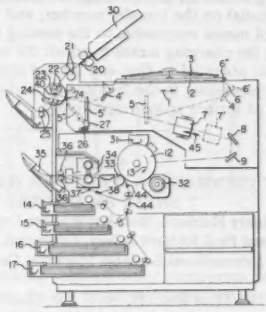
**Wilhelm Knechtel, Biebertal, Fed. Rep. of Germany, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed May 14, 1976, Ser. No. 686,361**

**Claims priority, application Fed. Rep. of Germany, May 20, 1975, 2522264**

**Int. Cl.[2] G03G *15/00*; B65H *29/66***

**U.S. Cl. 355—11** **5 Claims**



1. A copying apparatus comprising in combination:

sheet original transport unit for moving a sheet original from a sheet original inlet to a sheet original outlet, and having a scanning section disposed between said inlet and outlet;

optical means including a lens and a mirror for projecting a scanned image of the original onto a photosensitive member to form a latent image thereon;

means for revolving said sheet original transport unit with the trailing end portion of the sheet original being held therein downstream of said scanning section, wherein said revolving movement is effected so as to return the trailing end portion of the sheet original to a position adjacent said sheet original inlet through which the sheet original has been transported;

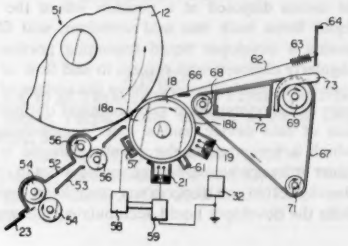
means for reversely transporting the sheet original through said transport unit, with the trailing end portion thereof forward, from said sheet original inlet, past said scanning section, to said sheet original outlet; and

means for visualizing the latent image projected on the photosensitive member.

## 4,110,031
## ELECTROSTATIC COPYING APPARATUS

Yutaka Ebi, and Masatoshi Saitou, both of Tokyo, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Sep. 28, 1976, Ser. No. 727,501
Claims priority, application Japan, Sep. 30, 1975, 50-117994
Int. Cl.[2] G03G *15/00*
U.S. Cl. 355—14 9 Claims

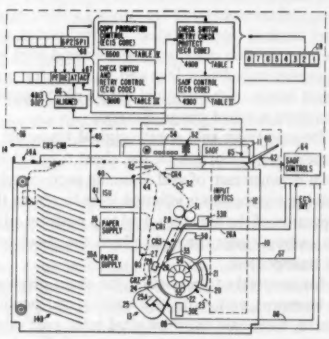


1. An electrostatic copying apparatus comprising:
a rotary photoconductive member rotatable in a predetermined direction;
a rotary transfer member formed with a dielectric peripheral surface and being rotatable in close proximity to a surface of the photoconductive member in a direction opposite to the predetermined direction so that the adjacent surfaces thereof move in the same direction and at the same surface speed which is selectively changeable between a first predetermined value and a second predetermined value;
charging means for applying an electrostatic potential to the dielectric surface of the transfer member;
sensing means for determining the value of the electrostatic potential on the transfer member; and
control means responsive to the sensing means for controlling the charging means to adjust the value of the electrostatic potential to first and second predetermined values corresponding to the first and second predetermined values of surface speed respectively.

## 4,110,032
## COPY PRODUCTION MACHINES HAVING SUPPLY SHEET PICK RETRY

James Henry Hubbard, Boulder; Wallace Lloyd Hubert, Broomfield, and Paul Richard Spivey, Longmont, all of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 20, 1976, Ser. No. 752,774
Int. Cl.[2] G03G *21/00*
U.S. Cl. 355—14 5 Claims

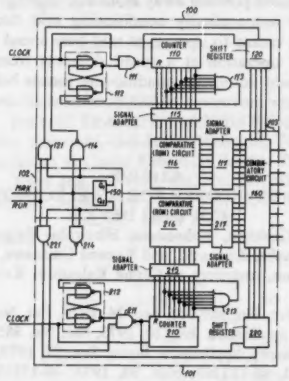


1. A copy production machine having a cut sheet copy supply, means to pick a sheet from said supply, an image transfer station for receiving a picked sheet for transferring an image thereto, means for removing an imaged sheet from said transfer station,
the improvement including in combination:
sense means for sensing a picked sheet ready to enter said image transfer station,
timing means indicating timed operation of said transfer station as ready to receive a copy sheet within a first time period and not ready in a second time period,
computer means programmed to have:
coincidence means jointly responsive to said sense means and said timing means to indicate sheet pick failure,
control means responsive to said failure indication to inhibit transfer of an image for one cycle of said image transfer station,
counter means indicating a number of successive pick failures, and
control means responsive to said counter means to turn off the copy production machine after a predetermined number greater than one of said pick failures.

## 4,110,033
## CONTROL SYSTEM FOR COPYING APPARATUS

Petrus J. M. Ophey, Grubbenvorst, Netherlands, assignor to Oce-van der Grinten N.V., Venlo, Netherlands

Filed Jan. 21, 1977, Ser. No. 761,284
Claims priority, application Netherlands, Jan. 30, 1976, 7600943
Int. Cl.[2] G03G *21/00*
U.S. Cl. 355—14 6 Claims



1. In copying apparatus comprising an endless photoconductive belt movable through a number of processing stations which together form a processing zone in which images of originals are formed on portions of the belt and are subsequently transferred to receiving material, which belt portions have predetermined locations relative to at least one marking on said belt, and a control circuit which emits control signals for activating or inactivating said processing stations in synchronization with the movement of said belt portions through said zone, the combination which comprises a detector installed beside the path of said belt and operative to emit a signal pulse upon being passed by a said marking and a said control circuit which comprises two partial circuits, each equivalent to the other and each operable to emit such control signals, and a switching circuit operative in response to said signal pulse to start the operation of one of said partial circuits for the emission of such control signals while the other of said partial circuits is operating for the emission of such control signals so that said other partial circuit will continue so operating until the last of the said belt portions which entered into said pro-

cessing zone before the emission of said signal pulse has passed entirely through said zone.

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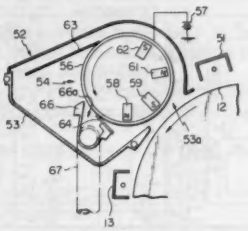
## 4,110,034
## DRUM CLEANING APPARATUS FOR ELECTROSTATIC COPYING MACHINE

**Minoru Suzuki, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan**

**Filed May 25, 1977, Ser. No. 800,262**
**Claims priority, application Japan, Jun. 24, 1976, 51/74884**
**Int. Cl.² G03G *21/00***
**U.S. Cl. 355—15** **9 Claims**




1. In an electrostatic copying machine including a photoconductive member, a cleaning apparatus for removing residual toner particles from the photoconductive member, said cleaning apparatus comprising:
- a hollow rotary cylinder disposed closely adjacent to the photoconductive member;
- means for producing relative movement between the photoconductive member and the cylinder;
- a magnet means disposed inside the cylinder;
- a carrier particle container, a lower portion of the cylinder being immersed in ferromagnetic carrier particles provided in the container, the carrier particles adhering to the cylinder due to the force of the magnet means to form a magnetic brush which brushingly engages with the photoconductive member to remove the residual toner particles therefrom;
- attraction means for attracting the toner particles to a periphery of the cylinder;
- carrier removal means for removing carrier particles from the cylinder; and
- toner removal means for removing toner particles from the cylinder.

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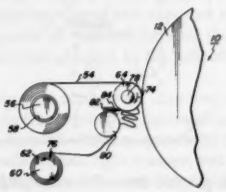
## 4,110,035
## CLEANING SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE

**Akira Kamata, Ebina, Japan, assignor to Rank Xerox, Ltd., London, England**

**Filed Sep. 18, 1976, Ser. No. 722,928**
**Claims priority, application Japan, Sep. 29, 1975, 50/131901[U]**
**Int. Cl.² G03G *21/00***
**U.S. Cl. 355—15** **6 Claims**




4. An electrophotographic printing machine of the type having toner particles developing a latent image recorded on a photoconductive member with the toner powder image being transferred from the photoconductive member to a copy sheet, wherein the apparatus for cleaning untransferred toner particles from the photoconductive member includes:
- a flexible web;
- a pressure member arranged to hold a portion of said web in engagement with the photoconductive member to remove toner particles therefrom;
- a supply station storing an unused supply of said web therein;
- a receiving station housing a used supply of said web therein having thereon toner particles removed from the photoconductive member;
- means for advancing said web from said supply station to said receiving station so that successive portions of said web engage the photoconductive member;
- a guide shaft engaging an intermediate portion of said web to maintain a preselected tension therein;
- a bracket mounted on said guide shaft; and
- a blade having one marginal edge portion thereof secured to said bracket and the other marginal portion thereof engaging said pressure member to prevent said web from being wound about said pressure member.

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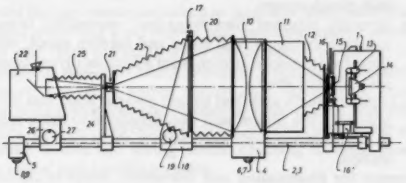
## 4,110,036
## UNIT FOR MAKING COLOR COMPONENT RECORDS OF COLOR TRANSPARENCIES

**Emile Armand Henri Guillaume, Ballaigues, Switzerland, assignor to Zelacolor Systems Establishment, Vaduz, Liechtenstein**

**Filed Dec. 1, 1976, Ser. No. 746,301**
**Claims priority, application Switzerland, Dec. 2, 1975, 15625/75**
**Int. Cl.² G03B *27/32, 27/52***
**U.S. Cl. 355—32** **20 Claims**




1. A unit for making selected color-component records of color transparencies for use in color printing, comprising:
- a light generator for producing a diverging beam of light,
- a plurality of different color filters to be placed in the light beam; filter placing means for selectively placing a respective different one of said color filters in the light beam;
- a light condenser for converging the light beam to a point of convergence, and which point of convergence varies in distance from the light generator as each different color filter is in the light beam;
- a camera, including an objective for receiving the converging light beam substantially at the point of convergence thereof;
- means for supporting a transparency in the converging light beam between said condenser and said camera objective;
- adjusting means for adjusting the point of convergence of the light beam in its distance from said light generator and said adjusting means being coordinated with said filter placing means such that as said filter placing means places a different filter in the light beam, said adjusting means adjusts the point of convergence of the converging light beam so that the point of convergence of each light beam colored by a respective said filter into said camera coincides with the optical center of said camera objective.

## 4,110,037
## DOCUMENT RECORDING MACHINES

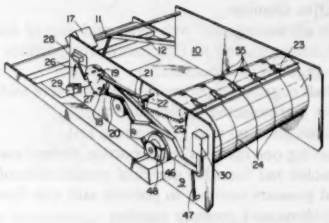
**Peter Arthur Harrison; Anthony John Parks; Malcolm Dennis Southgate, all of Bury St. Edmunds; William Derek Sleath, Thetford, and Richard Keith Hills, Bury St. Edmunds, all of England, assignors to W. Vinten Limited, Bury St. Edmunds, England**

**Filed Dec. 16, 1976, Ser. No. 751,017**

**Claims priority, application United Kingdom, Dec. 17, 1975, 51678/75**

**Int. Cl.[2] G03B** *27/48, 27/50*

**U.S. Cl. 355—48** **9 Claims**



1. A machine for photographing a document, or a series of documents or a continuous document onto a continuous film said machine comprising:

a rotatable drum for reception and transportation of said document, series of documents or continuous document, through a photographing station,

one or more finger bars operable by said document, series of documents or continuous document to actuate sequencing means,

clutch means engageable with drive means of said rotatable drum and operable by said sequencing means,

a co-axial shaft on, and drivable from said rotatable drum via said clutch means,

a securely attached film magazine, removable from said machine, having a feed spool and take-up spool, wherein the take-up spool is driven from a friction drive coupled to said co-axial shaft,

a capstan fixedly attached to said co-axial shaft and co-operable with the film of said film magazine to drive said film in co-operation with said take-up spool past an exposure station,

means for illuminating said document, series of documents or continuous document, and,

an optical system for transferring and reducing an image of said document, series of documents or continuous document from said photographing station to said exposure station, wherein the reduction of image is directly related to the reduction in peripheral movement of said rotatable drum and said capstan.

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## 4,110,038
## DOCUMENT FEEDER FOR A COPIER

**Robert Irvine, Riverside; Harry E. Luperti, Wilton, and Robert E. Manna, Newtown, all of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.**

**Filed Jun. 13, 1977, Ser. No. 805,801**

**Int. Cl.[2] G03B** *27/48, 27/50*

**U.S. Cl. 355—50** **11 Claims**

1. A document feeder adapted for use with a copier having a document illuminating station, a platen at the illuminating station and means for flash illuminating respective documents at the illuminating station, the document feeder comprising:

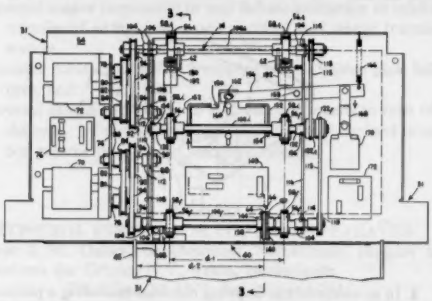
(a) first document feeding means for feeding respective documents to the illuminating station;

(b) second document feeding means for feeding respective documents from the illuminating station;

(c) third document feeding means cooperative with the first and second document feeding means for feeding respective documents to and from the illuminating station, said third document feeding means including means for engaging respective documents for feeding purposes;

(d) means for holding a portion of each of the respective documents fed to the illuminating station in document feeding relationship with respect to the second document feeding means;

(e) means for temporarily disengaging the document engagement means from engagement with respective documents fed to the illuminating station prior to illumination of the respective documents, whereby the respective documents



fed to the illuminating station settle on the platen prior to illumination thereof; and

(f) said first document feeding means including a rotatable drive shaft and at least one roller mounted thereon for rotation therewith and in document feeding engagement with respective documents, and said drive shaft mounted for elevation in response to respective documents of different thickness being fed into document feeding engagement with said at least one roller whereby said at least one roller elevates to accommodate respective documents of different thickness.

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## 4,110,039
## MICROFILM ENLARGING APPARATUS

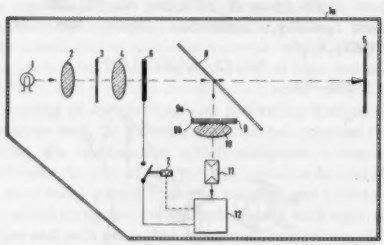
**Edgar Röder; Fritz Merk, both of Wiesbaden, and Lüto Röhrig, Naurod, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Dec. 23, 1976, Ser. No. 753,629**

**Claims priority, application Fed. Rep. of Germany, Dec. 27, 1975, 7541572[U]**

**Int. Cl.[2] G03B** *27/74, 27/76*

**U.S. Cl. 355—68** **10 Claims**



1. Electrophotographic microfilm-enlarging apparatus comprising means adapted to provide a source of light to expose photosensitive material through a microfilm to be enlarged,

sensing means adapted to sense the intensity of the light transmitted, in use of the apparatus, by the entire area of

the microfilm to be enlarged, substantially only within a wavelength range of from 360 to 560 nm,

a filter in the light path to the sensing means, said filter being capable of transmitting substantially only light having a wavelength of from 360 to 560 nm,

and control means adapted to control the total amount of light to which the photosensitive material is exposed in an enlargement step in dependence upon the value of the intensity sensed by the sensing means.

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## 4,110,040
## EXPOSURE SYSTEM FOR ELECTROPHOTOGRAPHIC COPIER

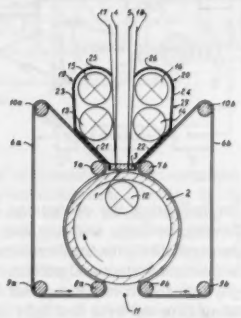
**Albert Jan Wittenberg, Velden, and Guido J. M. van der Velden, Valkenswaard, both of Netherlands, assignors to Océ-van der Grinten N.V., Venlo, Netherlands**

**Filed Oct. 29, 1976, Ser. No. 737,048**

**Claims priority, application Netherlands, Apr. 20, 1976, 7604118**

**Int. Cl.² G03B *27/54, 27/32;* G03G *15/00***

**U.S. Cl. 355—70** **5 Claims**



1. In an exposure device for an electrographic copier, including means defining a slot-shaped zone for stripwise exposure of an original or a portion thereof, light sources for illuminating the exposure zone, and an optical system for projecting an image from said exposure zone into an image plane, there being at the object side of the optical system an object space occupied by the beams of light that participate in the formation of the image and a reflection object space, inclusive of the object space, in which an object or a portion thereof in the exposure zone is imagable directly or by specular reflection, the improvement which comprises

(a) at the side of said exposure zone facing away from said optical system, a first exposure system comprising a tubular light source disposed parallel to the longitudinal axis of said exposure zone;

(b) at the side of said exposure zone directed toward said optical system, a second exposure system comprising at least four tubular light sources which are disposed parallel to the longitudinal axis of said exposure zone in two equal groups opposite to one another, all these light sources lying outside but adjacent to the reflection object space; and

(c) a diffusely reflecting wall disposed about the light sources of each said group of light sources, each said wall having the form of a surface generated by a straight line moving parallel to said light sources, and extending at one end thereof at least to the vicinity of said exposure zone, and extending at the opposite end thereof, at the side of the related group of light sources toward said optical system, at least as far as the reflection object space and at most as far as the object space.

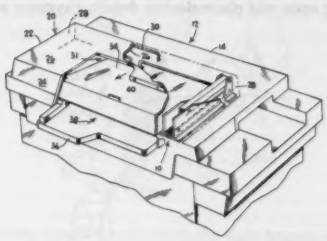
## 4,110,041
## MEANS FOR SELF-POSITIONING PLATEN COVERS

**Harry E. Luperti, Wilton, and Robert E. Manna, Newtown, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.**

**Continuation-in-part of Ser. No. 756,348, Jan. 3, 1977. This application Jun. 13, 1977, Ser. No. 805,634**

**Int. Cl.² G03B *27/62***

**U.S. Cl. 355—75** **9 Claims**



1. In a copier including framework and a platen on which respective documents of different thickness may be placed for copying purposes, and means for covering said platen, self-positioning apparatus comprising:

a. linkage means for movably supporting said covering means, said linkage means adapted to permit movement of said covering means between a predetermined position adjacent to said platen for holding respective documents of minimal thickness in contact with said platen and respective positions away from said platen for holding respective documents of greater thickness in contact with said platen;

b. resilient means for urging said covering means away from said platen;

c. means for maintaining said covering means in said predetermined and respective positions; and

d. said linkage means including at least four links, one of said links including a portion of said covering means, another of said links including a portion of said framework, two other of said links being movable links, said maintaining means including spring means, said maintaining means including roller means extending from one of said movable links and into contact with said spring means, and said roller means and spring means coacting to resist movement of said covering means.

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## 4,110,042
## METHOD AND APPARATUS FOR PHOTOELECTRICALLY DETERMINING THE POSITION OF AT LEAST ONE FOCAL PLANE OF AN IMAGE

**Ludwig Leitz, Wetzlar, Fed. Rep. of Germany, assignor to Ernst Leitz Wetzlar GmbH, Marl, Fed. Rep. of Germany**

**Continuation of Ser. No. 671,103, Mar. 29, 1976, abandoned. This application Dec. 1, 1977, Ser. No. 856,585**

**Claims priority, application Fed. Rep. of Germany, Apr. 24, 1975, 2518209**

**Int. Cl.² G01C *3/08***

**U.S. Cl. 356—4** **14 Claims**

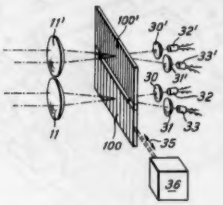
1. In a method for measuring the relative distance between an object emanating light fluxes and a reference system using an optical correlator system containing at least one imaging optic having at least an image plane and at least an image space, at least one screen provided with at least one optically active structure and at least one photoelectric detector system associated with said optically active structure for determining unambiguously distance and range, the improvement comprising:

(a) utilizing at least two optically active structures provided with optically effective properties differing from structure to structure, to form a plurality of beam guiding systems;

(b) locating said structures within said image space for guid-

ing said light fluxes into a plurality of directions and for generating distinct modulation characteristic light fluxes;

(c) associating with each of said beam guiding systems one of said photoelectric detector systems, each of which generates at least one output signal in response to a relative axial motion between an image of said object and said structure, and in dependence upon the distance between said object and said structure of said reference system according to said distinct modulation characteristic light fluxes impinging upon said photoelectric detector systems according to




said differing optically effective properties of said structures, said output signals differing from one another in frequency and phase and having each a maximum in signal amplitude at the focusing of said object in said image plane of said imaging optic; at the defocusing of said object, said signal amplitudes diminishing; and

(d) comparing said output signals with respect to their phases and determining from said comparison the position of said structure with respect to said imaging optic characterized by said maxima of said signal amplitudes.

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**4,110,043**

## APPARATUS FOR COUNTING AND CLASSIFYING PARTICLES

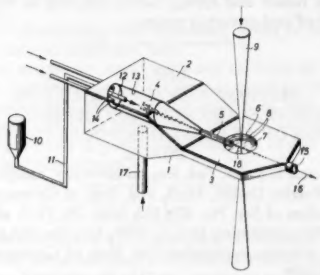
**Wolfgang Günter Eisert, Hannover, Germany, assignor to Gesellschaft fur Strahlen- und Umweltforschung mbH, Munchen, Neuherberg, Germany**

**Filed Sep. 24, 1976, Ser. No. 726,275**

**Claims priority, application Fed. Rep. of Germany, Sep. 27, 1975, 2543310**

**Int. Cl.[2] G01N *15/02*; G01D *21/04*; G01N *21/00***

**U.S. Cl. 356—102** **7 Claims**




1. In apparatus for counting and measuring the major dimension of particles of nonspherical shape and including a laser for producing a laser beam and a laser radiation detector, the improvement wherein: said apparatus comprises a flow nozzle having a tapered outlet end which terminates in a capillary nozzle, means delivering a stream of such particles to said flow nozzle, means delivering a fluid into said flow nozzle upstream of said outlet end to form a first entraining stream which entrains the stream of particles and hydrodynamically focusses the particle stream into a thin stream in the first entraining stream, with the major axes of the particles aligned with the axis of the thin stream in said capillary nozzle, the hydrodynamically focussed stream being directed from said capillary nozzle to intersect the laser beam, a jacket pipe disposed around said flow nozzle and providing a second entraining stream for the entrained stream of particles leaving said capillary nozzle, and means giving the laser beam a diameter which, at the point of intersection with the particle stream, is no greater than the width of the particles; and said detector is disposed to receive the laser radiation transmitted by the particles as they pass through the laser beam.

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**4,110,044**

## METHOD FOR DETERMINATION OF CONCENTRATION

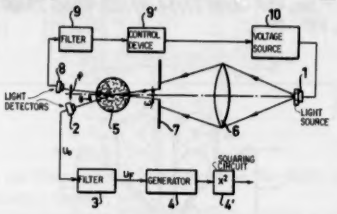
**Torulf Pettersson, Stockholm; Gerdt Fladda, Täby, and Lennart Eriksson, Vallentuna, all of Sweden, assignors to Svenska Traforskningsinstitutet, Stockholm, Sweden**

**Filed Nov. 23, 1976, Ser. No. 744,362**

**Claims priority, application Sweden, Dec. 1, 1975, 7513524**

**Int. Cl.[2] G01N *21/26, 33/46***

**U.S. Cl. 356—103** **12 Claims**




1. A method for indicating the percentage of suspended substances in a flowing medium, said medium being illuminated with light perpendicularly to the direction of flow with an intensity that is mainly constant and predetermined during measuring, the light radiated from the medium in a predetermined direction being detected by a first light detector transforming the detected light into an electrical signal varying in dependence on the light intensity, characterized in forming the square of the effective value of that portion of the signal which is within a predetermined frequency range, and deriving the percentage by means of said square of the effective value.

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**4,110,045**

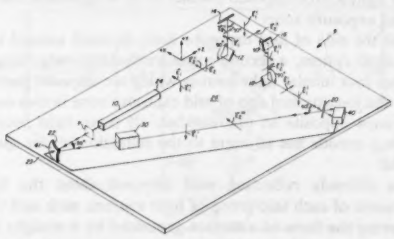
## ELECTROMAGNETIC WAVE RING RESONATOR

**Irl Wilson Smith, Jr., Newton, and Terry A. Dorschner, Waltham, both of Mass., assignors to Raytheon Company, Lexington, Mass.**

**Filed Jan. 2, 1976, Ser. No. 646,308**

**Int. Cl.[2] G01B *9/02***

**U.S. Cl. 356—106 LR** **24 Claims**



1. In combination:

(a) an electromagnetic wave ring resonator wherein resonant electromagnetic waves propagate through a nonsolid medium;

(b) means, included in such ring resonator, for spatially

rotating the electromagnetic field distribution of the resonant electromagnetic waves as such waves pass through the nonsolid medium about the direction of propagation of such waves to enable the electromagnetic waves in such resonator to resonate with different frequencies; and

(c) means for producing different phase delays to the electromagnetic waves having the same polarization state propagating in the resonator in opposite directions.

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## 4,110,046
## OPTICAL APPARATUS AND METHOD

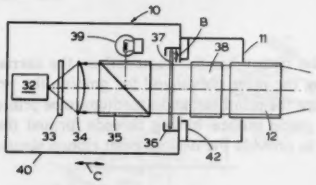
**Lionel Richard Baker, Orpington, and Tadeusz Wojtowicz, London, both of England, assignors to National Research Development Corporation, London, England**

**Filed Nov. 10, 1976, Ser. No. 740,542**

**Claims priority, application United Kingdom, Nov. 14, 1975, 47058/75**

**Int. Cl.² G01B 9/00**

**U.S. Cl. 356—124** **21 Claims**




1. A method of measuring a predetermined parameter of an optical component comprising inserting the optical component under test in an analyser means, aligning a light generator means in a desired position relative to the optical axis of the optical component under test by utilizing a selected screen of a set of screens including an indication of a predetermined position relative to the optical axis of the light generator means by projecting light from a subsidiary light source within the analyser means along the optical axis of the analyser means through the screen during the setting up operation, and by aligning the light generator means with the image of the indication, the light generator means including a light source and the analyser means including a light detector, selecting one of the set of screens which includes a pattern which pertains to said predetermined parameter, mounting the selected screen between the light detector and the light generator means, and processing the signal detected by the light detector to measure the desired parameter.

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## 4,110,047
## INSPECTION APPARATUS FOR AUTOMATICALLY DETECTING THE UNEVENNESS OR THE FLAWS OF A COATING

**Tokuji Takahashi, Hino, Japan, assignor to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan**

**Filed Mar. 17, 1976, Ser. No. 667,966**

**Claims priority, application Japan, Mar. 18, 1975, 50-33322**

**Int. Cl.² G01N 21/32**

**U.S. Cl. 356—200** **10 Claims**

1. A scanning inspection apparatus comprising:

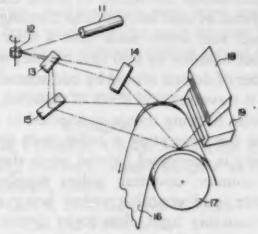
a means for supporting and moving an object to be scanned;

a light beam generating means including a laser oscillator;

a rotating mirror for directing a light beam radiated by said light beam generating means to the object;

a semitransparent mirror for dividing a light beam reflected by the rotating mirror into two light beams;

plural mirrors for reflecting each of said two light beams divided by the semitransparent mirror, said plural mirrors being so arranged that the light path length of one light beam from the semitransparent mirror to the object is the same as that of the other light beam from the semitransparent mirror to the object and the divided two light beams impinge on a point on the object, each of the light beams having a different angle of incidence with respect to the said point on the surface of the object, with the angle of incidence of one of the light beams being larger than 70° and the angle of incidence of the other light beam being smaller than 45°; and




light detecting means for receiving the light beams reflected by the surface of the object; wherein a plane including a light path of the light beam radiated by the light beam generating means and a light path of the light beam reflected by the rotating mirror is arranged to be perpendicular to the reflecting face of the rotating mirror.

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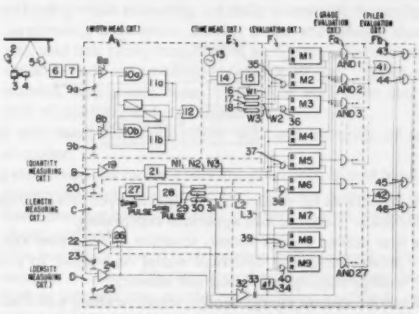
## 4,110,048
## METHOD OF AND AN APPARATUS FOR INSPECTING A TRAVELING SHEET MATERIAL

**Shoji Akutsu; Yasumasa Watanabe; Yasuhiko Mashino, all of Chiba; Tomohiro Chaki, and Masakazu Fujita, both of Tokyo, all of Japan, assignors to Kawasaki Steel Corporation and Toei Denshi Kogyo Kabushiki Kaisha, Tokyo, both of, Japan**

**Continuation of Ser. No. 521,159, Nov. 5, 1974, abandoned. This application Jul. 16, 1976, Ser. No. 705,826**

**Int. Cl.² G01N 21/16**

**U.S. Cl. 356—200** **15 Claims**




1. Apparatus for inspecting a traveling sheet material for determining characteristics of defects in said material, said apparatus comprising a light source and a means for scanning a beam of said light source across said traveling sheet material, photodetector means arranged to receive light reflected from said sheet material, and wave shaping means connected to said photodetector means for shaping the signal received from said photodetector means, said photodetector means receiving scattered light as said beam intersects the boundaries of a defect, said wave shaping means providing a positive pulse as said scanning light beam crosses one side boundary of said defect and providing a negative pulse as said scanning light beam completes its traversement of the defect and crosses the other side of said defect, said apparatus further comprising;

first pulse forming means connected to said wave shaping means responsive to said pulse of one polarity to generate

a step pulse and responsive to the next pulse of an opposite polarity to terminate said step pulse, whereby the length of said step pulse corresponds to the width of said defect,

second pulse forming means connected to said wave shaping means for generating a pulse each time a pulse of one polarity is generated by said wave shaping means, first counter means connected to count the number of pulses generated by said second pulse forming means, and means to read said count each time a scan is completed, the number counted by said first counter means equalling the number of defects sensed by said scanning light beam each time it traverses said sheet of material, and

third pulse forming means connected to said wave shaping means for generating a pulse each time a pulse of one polarity is generated by said wave shaping means, a second counter, counting pulses supplied to said second counter, said counting pulses being synchronized with said scanning light, first logic circuit means connected between said third pulse forming means and said second counter for enabling said second counter to increment its count each time a counting pulse is provided and said third pulse forming means successively produces a pulse, whereby said second counter keeps counting for each scan so long as a defect is present to provide a count corresponding to the length of said defect.

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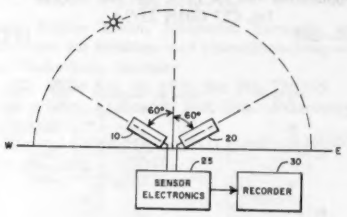
**4,110,049**

## SUN METER

**Robert E. Younskevicius, Largo, Fla., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Mar. 8, 1977, Ser. No. 775,493**
**Int. Cl.[2] G01J *1/42;* H01J *39/12***
**U.S. Cl. 356—222** **5 Claims**




1. Apparatus for measuring energy received from the sun at a particular location, said apparatus comprising:

a first radiant energy sensor, sensitive along a first axis, for producing a first electrical signal responsive to radiant energy impinging on said first sensor;

a second radiant energy sensor, sensitive along a second axis displaced 120° from said first axis, for producing a second electrical signal responsive to radiant energy impinging on said second sensor; and

summing means for receiving said first and second electrical signals and for providing an output signal which is the sum of the two.

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**4,110,050**

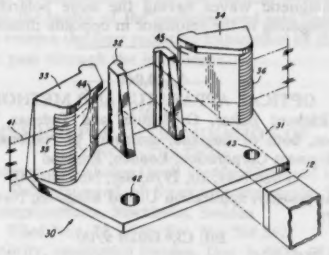
## PRINT RIBBON HANDLER

**James Carlos Wood, Houston, and Francis Adolph Felcman, Richmond, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Apr. 4, 1977, Ser. No. 784,498**
**Int. Cl.[2] B41J *35/04***
**U.S. Cl. 400—248** **7 Claims**

1. A printer assembly of the type having a constant slant angle print ribbon with a constant vertical rate of change with respect to the horizontal movement of a carriage as the carriage moves back and forth across a printing span, comprising:

(a) a printhead, having an inpact end, mounted on the carriage; and




(b) a print ribbon handler mounted on the carriage for receiving the print ribbon and for guiding the print ribbon between the printhead and a medium to be printed, including a guide surface having threads formed thereon at a pitch to provide the desired print ribbon slant angle.

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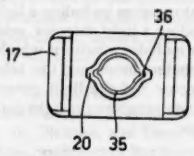
**4,110,051**

## APPARATUS FOR PRODUCING A NON-RELEASABLE CONNECTION AND NON-RELEASABLE CONNECTION PRODUCED WITH SUCH APPARATUS

**Karl Mettler, Buchs, Switzerland; Paul Marxer, Eschen, Liechtenstein, and Arthur Tiefenthaler, Frastanz, Austria, assignors to Press- und Stanzwerk AG, Eschen, Liechtenstein**

**Filed May 20, 1977, Ser. No. 799,100**
**Claims priority, application Switzerland, Jun. 3, 1976, 6998/76**
**Int. Cl.[2] F16C *11/06***
**U.S. Cl. 403—157** **1 Claim**




1. A non-releasable connection comprising the combination of:

(I) a shaft having a lengthwise axis and a shaft end, said shaft end possessing:

(a) an end surface having a substantially ring-shaped groove;

(b) a shoulder spaced in the direction of the lengthwise axis of said shaft from said end surface;

(c) a flange extending substantially over the entire periphery of said shaft end and formed of one-piece with such shaft end;

(d) a pair of wedges formed of one-piece with said shaft end and extending substantially parallel to said lengthwise axis of said shaft, said wedges being located essentially diametrically opposite one another at said shaft end; and

(e) said end surface having a substantially ring-shaped groove provided with two essentially diametrically oppositely situated protuberances located at said wedges;

(II) a fork member secured to said shaft end and possessing:

(a) a bore into which extends such shaft end;
(b) two grooves provided in said bore arranged diametrically opposite one another and into which extend said wedges, in order to thereby secure the fork member against rotation relative to such shaft end; and
(c) two bore edges, said shoulder bearing against one of said bore edges and said flange bearing against the other bore edge, in order to secure the fork member against axial displacement relative to the shaft end.

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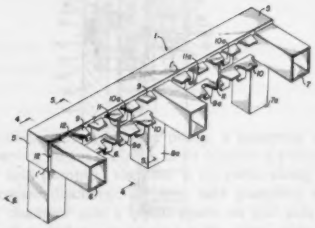
**4,110,052**

## MULTIPLE ELEMENT FOR FORMING VARIOUS STRUCTURES WHEN CONNECTED TO BOX-FORM PANELS FOR FURNITURE OR THE LIKE

**Giulio Polvara, Milan, Italy, assignor to Beylerian Limited, New York, N.Y. and Kartell, S.p.A., Milan, Italy**

**Filed Jun. 30, 1975, Ser. No. 591,829**
**Int. Cl.[2] A47B *47/04***
**U.S. Cl. 403—295** **4 Claims**



1. A connecting element for use in assembling furniture, shelves and the like comprising an elongated tubular body of square section including a pair of exposable walls and further having oppositely disposed closed end walls and at least three equally spaced opposed pairs of right angularly extending tubular jointing means of square section each of said jointing means projecting outwardly from said elongated tubular body from zones spaced inwardly of said end wall and further spaced inwardly from at least one of said exposable walls, said jointing means serving to support plurally perforated planar elements arranged to receive said outwardly projecting jointing means and further including oppositely disposed walls and additional frustum-shaped support means which lie in planes coplanar with said walls.

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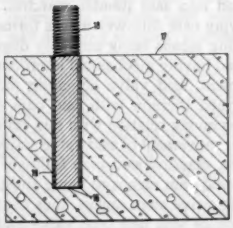
**4,110,053**

## ARRANGEMENT FOR FASTENING A STEEL DOWEL

**Josef Buchholz, Birkenweg 5, 5581 Liesenich, Fed. Rep. of Germany**

**Filed Oct. 13, 1976, Ser. No. 732,131**
**Claims priority, application Fed. Rep. of Germany, Oct. 15, 1975, 25461103; Jan. 9, 1976, 2600610**
**Int. Cl.[2] B25G *3/02***
**U.S. Cl. 403—361** **1 Claim**



1. An arrangement for fastening a steel dowel in a dowel hole of a structural member, particularly a concrete or wood structural member comprising: a synthetic resin layer on the wall of the dowel hole; a synthetic resin-filler mixture coated on said steel dowel, the surface of said coating of said steel dowel being roughened, the surface of said steel dowel being ribbed; and hardener means on the roughened synthetic coating of said steel dowel, said synthetic resin layer comprising a single-component resin, said synthetic resin mixture being free of a filler; and sleeve means with an internal thread connected to said steel dowel.

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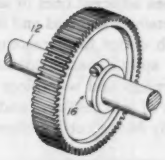
**4,110,054**

## CLAMPABLE PLASTIC GEAR AND THE LIKE

**Carl A. Moeller, Jr., Duxbury, Mass., assignor to Flexothane Corporation, Randolph, Mass.**

**Filed Oct. 4, 1976, Ser. No. 729,115**
**Int. Cl.[2] F16B *2/08***
**U.S. Cl. 403—373** **1 Claim**



1. An annular part such as a gear for clamping engagement with a cylindrical shaft, comprising in combination
(a) an annular body portion formed of a hard and slightly resilient polyurethane plastic material having a durometer hardness of approximately 75° on the Shore "A" scale, and
(b) a flexible metal band,
(c) said body portion being formed with an integral cylindrical hub portion extending coaxially to one side thereof and terminating in an outer annular collar providing a shoulder, said hub being formed with an opening therethrough coaxial with an opening in said gear and defining a smooth, continuous, inner cylindrical wall from end to end of said gear and hub openings,
(d) said band mountable about said hub inwardly of said shoulder,
(e) screw and nut means connecting the ends of said band in tangential relation to said hub portion for tensioning said band and applying clamping pressure thereto uniformly about said hub,
(f) the periphery of said body portion being formed with an integral annular wide rim formed with integral gear teeth and an integral thin annular web defining said body portion and connecting said rim to said hub portion, said hub and collar extending axially beyond an end of said rim a distance sufficient to allow access to said screw by a tool oriented parallel to said web portion.

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**4,110,055**

## TOOL ASSEMBLY AND INSERTED-TOOTH CUTTER FOR MILLING CYLINDRICAL SURFACES ON A WORKPIECE

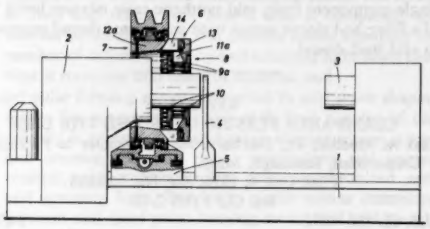
**Gottfried Blaimschein, and Otto Marzy, both of Steyr, Austria, assignors to GFM Gesellschaft fur Fertigungstechnik und Maschinenbau Aktiengesellschaft, Steyr, Austria**

**Filed Jul. 14, 1977, Ser. No. 815,647**
**Claims priority, application Austria, Jul. 26, 1976, 5465/76**
**Int. Cl.[2] B23B *51/00*; B26D *1/12***
**U.S. Cl. 408—203.5** **7 Claims**

1. A tool assembly for milling cylindrical surfaces on a workpiece, comprising

a carrying drum which has an end face and is adapted to be rotatably mounted and to be rotationally driven, and

an inserted-tooth cutter which comprises an adapter ring detachably flanged to said end face and provided with at least two retainers which are axially spaced from each other and from said end face, and with radial through



openings between adjacent ones of said fixing means and between said retainers and said end face,

said inserted-tooth cutter further comprising at least two axially spaced apart, coaxial toothholders, which are adapted to surround said workpiece and are secured to respective ones of said retainers and carry teeth having radially inwardly facing cutting edges.

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**4,110,056**

## FIBRE REINFORCED PLASTICS STRUCTURE

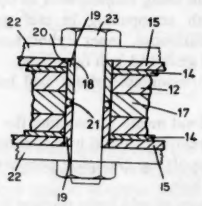
**Basil Charles James Stevenson, Corton Denham, Nr. Sherborne, England, assignor to Westland Aircraft Limited, Yeovil, England**

**Filed May 2, 1977, Ser. No. 792,574**

**Claims priority, application United Kingdom, May 6, 1976, 18513/76**

**Int. Cl.² B64C *27/46***

**U.S. Cl. 416—230** **2 Claims**



1. A helicopter rotor blade including a root end structure comprising composite materials and having opposed generally parallel surfaces for clamping between fork members extending from a rotor hub,

at least one attachment hole extending through the root end structure between opposed surfaces, and mating holes in the fork members,

two bushes disposed in each attachment hole, said bushes having a combined length less than a thickness of the root end structure,

said bushes being secured within the structure so that outer ends of the outermost bushes are flush with respective surfaces of the structure and so that said bushes are spaced-apart axially within the structure,

a resilient washer located in the space between the bushes,

and bolt means extending through the holes in the fork members and the attachment holes in the root end structure so as to clamp the structure between the fork members.

**4,110,057**

## GAS LIFT MANDREL VALVE MECHANISM

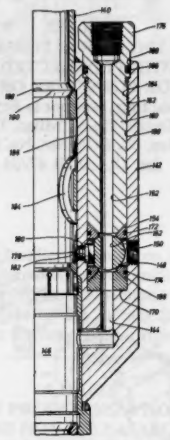
**Everett D. McMurry, and Bolling A. Abercrombie, both of Houston, Tex., assignors to McMurry Oil Tools, Inc., Houston, Tex.**

**Division of Ser. No. 571,905, Apr. 28, 1975, Pat. No. 4,035,103.**

**This application Jun. 7, 1977, Ser. No. 804,445**

**Int. Cl.² F04F *1/18***

**U.S. Cl. 417—109** **4 Claims**



1. A mandrel valve mechanism for controlling the flow of gas through the gas lift valve mechanism that achieves gas induced production of fluid from wells, said mandrel valve mechanism comprising:

a tubular mandrel having a production passage therethrough adapted to be interconnected between sections of production tubing, said tubular mandrel being formed to define opening means intermediate the extremities thereof;

a valve housing being carried by said mandrel, said valve housing defining an internal valve chamber having an inlet opening and having an outlet opening disposed in registry with said opening means of said tubular mandrel, said valve housing being formed to define a valve stem passage communicating said valve chamber with said production passage of said tubular mandrel;

a valve element being disposed within said valve chamber and being movable from a closed position where said valve element blocks communication between said inlet and said outlet to an open position where communication between said inlet and outlet is defined through said valve element;

said valve element comprises a ball type valve element being disposed within said valve chamber and being rotatably movable for controlling flow through said valve mechanism and valve stem means being disposed in operative engagement with said ball type valve element and extending from said valve chamber through said valve stem passage and into said tubular mandrel, said valve stem means having cam follower means formed thereon; and

valve actuating means being movably disposed within said mandrel and having mechanical interconnection with said valve element, said valve actuating means having cam means formed thereon with said cam means being disposed in receiving relation with said cam follower means, upon linear movement of said valve actuator means within said tubular mandrel said cam follower means being induced by said cam means to cause substantially 90° rotation of said valve stem means, thus causing substantially 90° rotation of said ball type valve element within said valve chamber said valve actuating means being controllably movable responsive to manipulation thereof by a valve

actuating tool that is movable within said production tubing of said well.

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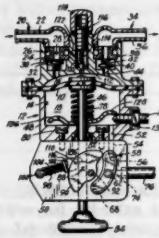
4,110,058

## VACUUM-OPERATED LIQUID PUMP

Juan Pedro Langle, and Miguel Juan Langle, both of Campichuelo 1539-Avellaneda-Pcia, Buenos Aires, Argentina

Filed Dec. 8, 1976, Ser. No. 748,754
Claims priority, application Argentina, Dec. 9, 1975, 205772
Int. Cl.[2] F04B *43/06, 45/00;* F01L *31/18*
U.S. Cl. 417—395 9 Claims



1. In a vacuum-operated liquid pump, a pumping member and pump housing means defining in its interior a pump chamber in which said pumping member is movable along suction inlet and pressure discharge strokes, said pumping member dividing said chamber into a liquid space on one side of said pumping member and a gas space on the other side of said pumping member, supply means commuicating with said liquid space for supplying liquid thereto in response to movement of said pumping member along said suction inlet stroke thereof, discharge means communicating with said liquid space for discharging liquid under pressure out of the latter during movement of said pumping member along said pressure discharge stroke thereof, passage means formed at least in part in said housing means and communicating with said gas space for placing the latter in communication with a source of vacuum, spring means operatively connected with said pumping member for urging the latter along said pressure discharge stroke thereof, and valve means cooperating with said passage means for placing the latter alternately in communication with the outer atmosphere and through means in said valve means in communication with the source of vacuum, said valve means being operatively connected with said pumping member to be operated thereby for placing said passage means in communication with the source of vacuum when said pumping member reaches the end of said pressure discharge stroke thereof and in communication with the outer atmosphere when said pumping member reaches the end of said suction inlet stroke thereof, the operative connection of said valve means to said pumping member including a rod fixed to said pumping member to reciprocate therewith, and a rocking member turnably carried by said housing means, said rod being formed with a recess and said rocking member having a projection fixed thereto and extending into said recess for transmitting movement between said rod and rocking member, the latter being rocked in opposed directions during the suction inlet and pressure discharge strokes of said pumping member, and said valve means responding to rocking of said rocking member in one direction to place said passage means in communication with the source of vacuum and in the opposite direction to place the passage means in communication with the outer atmosphere, said passage means terminating in an open end which when uncovered by said valve means communicates with the outer atmosphere and which when covered by said valve means communicates through said valve means with said source of vacuum, said valve means itself being carried by said housing means for rocking movement between positions covering and uncovering said open end of said passage means, and said valve means being situated in the path of rocking movement of said rocking member to be engaged and turned thereby to said position covering said open end of said passage means when said pumping member reaches the end of its pressure-discharge stroke and to a position uncovering said open end of said passage means when said pumping member reaches the end of its suction inlet stroke, said valve means having no mechanical connection to said rocking member and being moved only by being situated in the path of movement of said rocking member, with said valve means remaining stationary in one or the other of said positions thereof until said valve means is engaged and moved by said rocking member.

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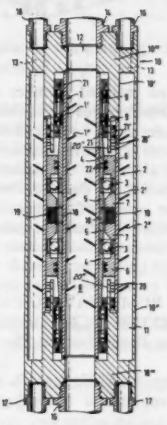
4,110,059

## PUMPING DEVICE

Miguel Kling, Am Hugel 14, 8136 Percha, Fed. Rep. of Germany

Filed Aug. 19, 1976, Ser. No. 715,660
Claims priority, application Fed. Rep. of Germany, Dec. 18, 1975, 2557202
Int. Cl.[2] F04B *17/00*
U.S. Cl. 417—424 15 Claims



1. An electrical pumping device comprising at least two coaxially rotatable pump impellers, at least two coaxial separate passageways, one impeller positioned within each passageway, pole support parts attached to each of said impellers, said pole support parts forming a part of at least one electromotor and distributed about the axis of rotation in a radially spaced relation, each pump impeller together with adjacent pump impeller forming the counter-rotating parts of an electromotor by cooperation of the pole support parts connected with these pump impellers.

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4,110,060

## HIGH DISPLACEMENT-TO-SIZE RATIO ORBITING FLUID MECHANISM

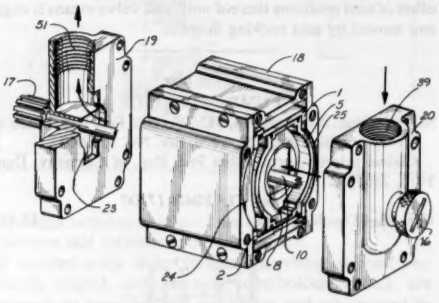
Frederick L. Erickson, 2610 Bosworth Dr., Fort Wayne, Ind. 46805

Filed Jun. 14, 1976, Ser. No. 695,722
Int. Cl.[2] F04B *19/22, 29/00*
U.S. Cl. 417—462 10 Claims

1. An orbiting piston fluid mechanism comprising:
a stationary mechanism housing;
an axially extending power transfer shaft supported in the housing for rotation about the shaft axis, at least part of the shaft being selectively axially movable;
an axially extending eccentric member coupled to the shaft for rotation therewith, the eccentric member axis displaced from and extending generally parallel to the shaft axis;

chamber means confined within the housing interior for reciprocating motion in a direction generally perpendicular to the shaft axis;

piston means supported on and rotatable relative to the eccentric member, and confined within and reciprocable within and relative to the chamber means in a direction generally perpendicular to the direction of chamber means reciprocation within and relative to the housing; and



means including an inclined member movable axially in response to axial movement of the axially movable part of the power transfer shaft for selectively varying the distance between the eccentric member axis and the shaft axis to thereby also vary simultaneously the extent of reciprocating motion of the chamber means within the housing and the extent of reciprocating motion of the piston means within the chamber means.

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**4,110,061**

**PERISTALTIC PUMP HAVING PARTICULARLY REINFORCED HOSE**

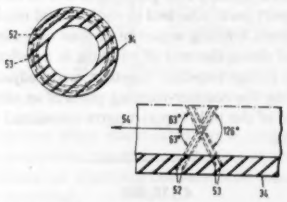
**Jan Willem Gerritsen, Raadhuisstraat 75a, Alphen an der Rijn, Netherlands**

**Filed Jan. 31, 1977, Ser. No. 764,407**

**Claims priority, application Netherlands, Feb. 24, 1976, 7601867**

**Int. Cl.² F04B *43/18, 43/12, 45/06***

**U.S. Cl. 417—477** **9 Claims**



1. In a peristaltic pump comprising a support track curved according to an arc of a circle located concentrically about a central shaft, a pump hose curved into contact with said support track and fastened at one end, and compression members arranged to be driven in successive spaced relationship in a circular path located around, and concentric with, said central shaft, said compression members being spaced radially inwardly from said arcuate support track so as to be capable of locally squeezing the pump hose shut, said pump hose having at least two layers of reinforcing threads consisting of windings extending in the peripheral direction of the hose and embedded in the wall thereof, the windings in the two layers extending obliquely to the longitudinal direction of the pump hose, so that the reinforcing threads of one layer cross those of the other, the improvement which comprises that the angle of crossing between the windings of the two layers of reinforcing threads is larger than the equilibrium angle, so that the pump hose tends to be elongated under the influence of internal delivery pressure, and that the pump hose is fastened at the end to which said compression members move along said support track.

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**4,110,062**

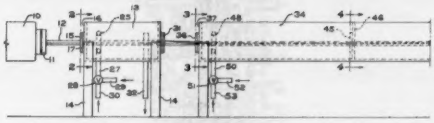
**PROCESSING EXTRUDED VINYL SIDING**

**James William Summers, Bay Village, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio**

**Filed Jan. 7, 1977, Ser. No. 757,702**

**Int. Cl.² B29C *25/00***

**U.S. Cl. 425—71** **1 Claim**



1. An apparatus for manufacturing thermoplastic house siding comprising an extruder for extruding an elongated cross-sectioned house siding panel with L-shaped end portions, a cooling tank mounted adjacent to said extruder, said cooling tank having a forward end and a rear end portion, a sizing die located at said forward end portion and said rear end portion of said cooling tank, and annealing tank, said annealing tank having a forward portion and a rearward portion, said forward portion of said annealing tank mounted closely adjacent to said rear end portion of said cooling tank, a sizing die mounted in said forward portion of said annealing tank, a sizing die mounted in said rear end portion of said annealing tank, a sizing die mounted in the intermediate portion of said annealing tank, a quenching tank, said quenching tank having a forward portion and a rear end portion, said forward portion of said quenching tank mounted adjacent to said rear end portion of said annealing tank, a sizing die mounted in said forward portion of said quenching tank, a sizing die mounted in said rear end portion of said quenching tank, means connected to each of said tanks for controlling the flow of fluids into and out of said tanks, temperature control means connected to said cooling tank to maintain the temperature range therein to between 50° F. and 212° F., and temperature control means connected to said annealing tank to maintain the temperature therein from 160° F. to 212° F.

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**4,110,063**

**GAS FIRE**

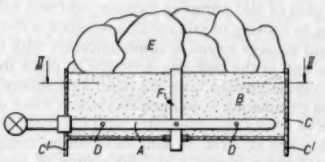
**Douglas Allison Mitchell, 7, Clifton Gardens, Eaglescliffe, Stockton-on-Tees, Cleveland, United Kingdom (TS16 9BB)**

**Filed Jul. 1, 1976, Ser. No. 701,607**

**Claims priority, application United Kingdom, Jul. 3, 1975, 28021/75**

**Int. Cl.² F24L *3/04***

**U.S. Cl. 431—125** **5 Claims**



1. A simulated solid fuel burning heating appliance comprising a mass of particulate refractory material in at least one open-topped tray, a plurality of refractory bodies shaped and

colored to simulate solid fuel mounted on the top of the mass of particulate refractory material with spaces between the bodies, a perforated tube embedded in said mass of refractory material with an end of the tube extending out of the tray, means for supplying gaseous fuel to said end of the tube to cause said gaseous fuel to flow upwardly through the mass of particulate refractory material to the spaces between the bodies and burn wth a luminous flame causing the refractory bodies to glow, and tube means defining at least one air passage which extends upwardly through the mass of particulate refractory material for providing combustion air to the gaseous fuel flowing to only some of said spaces between the bodies so that said gaseous fuel provided with combustion air from said passage burns with a higher temperature flame than the temperature of said luminous flame to cause the refractory bodies heated by the higher temperature flame to glow more brightly than the bodies heated by the luminous flame, thereby realistically simulating a solid fuel fire.

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**4,110,064**

## AIR-JET FURNACE

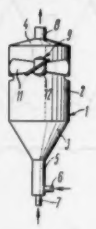
**Dmitry Afanasievich Vorona, ulitsa Dm. Ulyanova, 4, korpus 2, kv. 8; Vitaly Ivanovich Chikul, ulitsa Panferova, 8, kv. 170; Alexandr Stepanovich Smirnov, Leninsky prospekt, 73/8, kv. 149, all of Moscow; Olga Semenovna Chikul, ulitsa Uus, 13, kv. 5, Kiviyli, Estonskoi SSR; Boris Ivanovich Tygunov, ulitsa Panferova, 8, kv. 22, Moscow; Semen Alexandrovich Tager, ulitsa Dm. Ulyanova, 4, korpus 2, kv. 361, Moscow; Nikolai Nikolaevich Shipkov, ulitsa Magdagulovoi, 18, korpus 2, kv. 157, Moscow; Arkady Vitalievich Perepelkin, Kantemirovskaya ulitsa, 5-3, kv. 503, Moscow; Elizaveta Alexeevna Grigorieva, ulitsa Dm. Ulyanova, 4, korpus 2, kv. 8, Moscow, all of U.S.S.R.; Gennady Alexeevich Krasnovsky, deceased, late of Moscow, U.S.S.R., and Tatyana Sergeevna Krasnovskaya, administratrix, 1 Babiegorodsky pereulok, 15/17, kv. 13, Moscow, U.S.S.R.**

**Filed Jul. 2, 1976, Ser. No. 702,085**

**Claims priority, application U.S.S.R., Jul. 17, 1975, 2155002**

**Int. Cl.² F23M *9/06***

**U.S. Cl. 431—171** **5 Claims**



**1.** An air-jet furnace comprising: a vertical chamber having a conical bottom part which narrows downwards, an inlet-pipe means for admitting fuel and air to said chamber, means for connecting said inlet pipe means to said narrowing conical bottom part of said chamber, an outlet pipe means for removal of combustion products from said chamber at the top part of said chamber; a combustion stabilizer means stationarily mounted in the inner space of said chamber for repeated recirculation of said fuel in said vertical chamber, said stabilizer means comprising a blade-type mechanical swirling device, the blades of said swirling device being arranged across the chamber in the top part thereof upstream of said outlet pipe in the path flow of combustion products wherein said swirling device comprises a multiblade propeller having a hub closed at both ends thereof said closed-end hub adapted to deflect the flow of combustion products upward.

**4,110,065**

## COCK APPARATUS OF AUTOMATIC IGNITION TYPE FOR GAS APPLIANCE

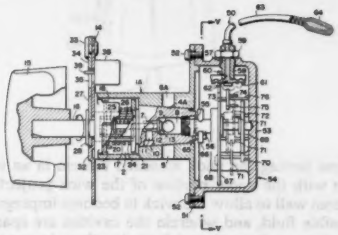
**Yasuo Fujiwara, Yokohama, Japan, assignor to Aero-Spec Products Co., Ltd., Tokyo, Japan**

**Filed May 16, 1977, Ser. No. 797,645**

**Claims priority, application Japan, Jul. 25, 1976, 51-102131**

**Int. Cl.² F23Q *7/12***

**U.S. Cl. 431—255** **9 Claims**



**1.** A cock apparatus of automatic ignition type for use in a gas appliance comprising:

a frame member;

a cock body mounted on one side of said frame member and having an internal space;

an ignition handle having a shaft extending at one end portion thereof into the internal space of said cock body and at the other end portion thereof toward the exterior through said frame member;

a valve member disposed within the internal space of said cock body for rotation with the turning movement of said ignition handle thereby permitting supply and shut-off of the flow of combustible gas toward a main burner and a pilot burner;

a spark generator generating sparks for igniting said pilot burner in response to the turning movement of said ignition handle; and

a device affixed to said cock body for preventing leakage of live combustible gas;

said live gas leakage preventive device comprising a casing mounted on the end face of said cock body, a rotary shaft journaled in said casing and capable of free rotation and restrained rotation relative to said valve member, spring means mounted on said rotary shaft for normally urging said rotary shaft in the closing direction of said valve member, heat sensor means mounted on said casing for sensing ignition and non-ignition of said burner, engaging means for forcedly interrupting the operation of said spring means by cooperating with said heat sensor means when said main burner is properly ignited, and means for releasing said engaging means thereby permitting said spring means to exert its resilient returning force at a constant speed when said heat sensor means does not operate or ceases to operate due to ignition failure or accidental flame extinction of said main burner.

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**4,110,066**

## FLOATING ILLUMINATING DEVICE

**Philip Joseph Murphy, San Mateo, Calif., assignor to Lancaster Colony Corporation, Columbus, Ohio**

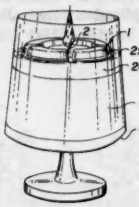
**Filed Feb. 28, 1977, Ser. No. 772,381**

**Int. Cl.² F23D *3/24***

**U.S. Cl. 431—320** **12 Claims**

**1.** An illuminating device of unitary construction comprising in combination a wick and a thin, formed member of oil impervious material for floating on a body of combustible fluid, the member comprising a central depending generally frusto-conical well portion and a plurality of annularly spaced elongate buoyancy imparting segmental cavities opening to the under-

side of the member and surrounding the well portion, channel means extending radially between the cavities from the outer edge of the well portion to the periphery of the member to allow combustible fluid to flow into the well portion, the well portion including a bottom wall with at least one wick retaining recess having the wick mounted therein in an upstanding position with the upper portion of the wick projecting above the bottom wall to allow the wick to become impregnated with combustible fluid, and wherein the cavities are spaced a substantial distance from the wick so that they do not suffer heat distortion when the wick is ignited.

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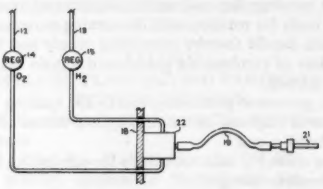
**4,110,067**

## GAS MIXER

**Harold G. Anderson, Kirtland, and Jeuel E. Guess, Willoughby Hills, both of Ohio, assignors to General Electric Company, Schenectady, N.Y.**

**Filed Aug. 31, 1976, Ser. No. 719,290**
**Int. Cl.[2] F23D *13/46***
**U.S. Cl. 431—346** **10 Claims**




1. A flashback tolerant mixer for gases comprising:
a block having at least two bores therein; and
pressure sensitive, flexible means, having a single bore and non-threadedly engaging said block, for enclosing the region wherein said bores emerge from said block and wherein said gases mix and for releasing from said block due to the pressure of a flashback.

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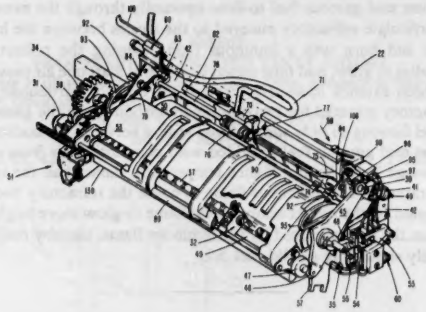
**4,110,068**

## HOT ROLLER FUSER HAVING MANUALLY OPERABLE JAM CLEARANCE MECHANISM

**Leon Calvin Brown; Earl Garland Edwards; Charles Edwin Peterson; Peter George Robinson, and Clement Card Wilson, all of Boulder, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Feb. 22, 1977, Ser. No. 771,126**
**Int. Cl.[2] B65H *29/56***
**U.S. Cl. 432—60** **14 Claims**

1. In an electrophotographic device wherein toner carried by a sheet of transfer material is fused to said sheet by the fusing nip of a hot roll fuser assembly, the improvement comprising:
sheet guide means movably supported on said fuser assembly and positioned upstream of said fusing nip, said sheet guide means being operative in a first position to receive and guide a sheet away from said fusing nip as the sheet's leading edge emerges therefrom;
manually operable means supported on said fuser assembly, said manually operable means having a first and a second position, and being connected to move said sheet guide means to a second position away from said fusing nip upon operation of said manually operable means to its second position, to thereby allow access to said fusing nip for purpose of sheet jam clearance and the like; and
locking means controlled by said manually operable means when in its first position to lock said sheet guide means in its first position.



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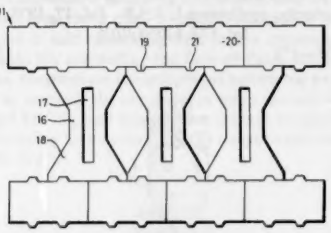
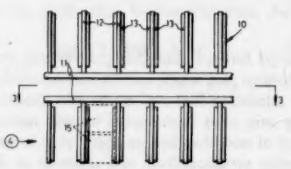
**4,110,069**

## SUPPORT STRUCTURE FOR CERAMIC WARE

**William John Lovatt, Stoke on Trent, England, assignor to Acme Marls Limited, Stoke on Trent, England**

**Filed Jan. 26, 1977, Ser. No. 762,527**
**Claims priority, application United Kingdom, Jan. 31, 1976, 3880/76**
**Int. Cl.[2] F27D *5/00***
**U.S. Cl. 432—258** **1 Claim**




1. A support structure for generally flat ceramic ware, the support structure comprising a plurality of generally planar components, all of which are die pressed and have precisely controlled dimensions in the plane of the components, said plurality of generally planar components comprising first such components including generally vertically disposed elongate posts and generally horizontally disposed elongate link members disposed in relatively staggered courses, the posts and link members having inter-fitting formations whereby they are

detachably connected together to provide an upright linear back wall of the support structure; second such components being secured to said first components generally perpendicular thereto and in generally parallel upright planes to form transverse walls; and a plurality of third such components secured to the transverse walls on one or both faces thereof to form fins extending laterally from the transverse walls in equally spaced generally horizontal planes.

4,110,070

## HEAT TRANSFER PRINTING ON ACIDIC MODIFIED SYNTHETIC FIBER

Takeo Kurahashi; Shigeo Maeda, Sanai Seki; Nobuo Suzuki, and Takayuki Sakai, all of Tokyo, Japan, assignors to Hodogaya Chemical Co., Ltd., Tokyo, Japan

Filed Mar. 8, 1977, Ser. No. 775,562
Claims priority, application Japan, Mar. 17, 1976, 51-28193; May 24, 1976, 51-59067; Jun. 11, 1976, 51-67767
Int. Cl.[2] D06P *1/38, 3/10, 3/52*
U.S. Cl. 8—2.5 R 6 Claims

1. A heat transfer printing which comprises quaternizing an indolenine methine compound on an acidic modified synthetic fiber to form the corresponding cationic indolenine methine dye with the acidic groups of said acidic modified synthetic fiber.

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4,110,071

## PROCESS FOR THE TONE-IN-TONE PRINTING AND PAD-DYEING OF TEXTILE MATERIAL MADE FROM FIBRE MIXTURES

Andres Schaub, Biel-Benken, and Gerhard Kögel, Reinach, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Filed May 26, 1976, Ser. No. 689,986
Claims priority, application Switzerland, May 26, 1975, 6715/75
Int. Cl.[2] D06P *3/82*
U.S. Cl. 8—21 R 19 Claims

1. In a process for the tone-in-tone printing and pad-dyeing of textile material made from fiber mixtures of cellulose and at least one synthetic material from the group of polyamide, polyester and cellulose acetate with the use of solvents having swelling properties selected from the group of glycols and glycol derivatives which process comprises printing or impregnating the textile material with a printing paste or padding liquor, subsequently subjecting the printing or the dyeing, after intermediate drying, to a heat treatment and subjecting the resultant material to a finishing process, the improvement according to which the dyestuff contained in the printing paste or padding liquor is at least one disperse dyestuff said dyestuff being produced in the printing paste or padding liquor itself by reaction of a coupling component with a diazo component.

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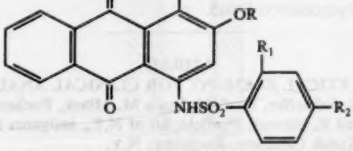
4,110,072

## COMPOSITION OF MIXED BENZENSULFONAMIDO ANTHRAQUINONE DYES AND LINEAR POLYESTER MATERIAL DYED THEREWITH

Joseph W. Fitzpatrick, Toms River, and Arthur D. Olin, Lakewood, both of N.J., assignors to Toms River Chemical Corporation, Toms River, N.J.

Filed May 31, 1977, Ser. No. 801,706
Int. Cl.[2] D06P *1/00;* C09B *1/00*
U.S. Cl. 8—25 10 Claims

1. A dyestuff composition consisting essentially of two or more dyes selected from the group of the formula



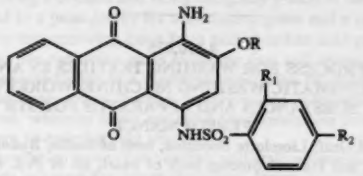
wherein

R is methyl, ethyl, hydroxyethyl, β-methoxyethyl or β-ethoxyethyl,

$R_1$ is hydrogen or methyl and

$R_2$ is hydrogen, methyl or methoxy, provided that $R_1$ and $R_2$ are both hydrogen in one of the elected dyes and provided that the dye present as the minor component is present to the extent of at least about 10% by weight.

4. A process of dyeing linear polyester material comprising the step of applying thereto an aqueous dispersion of a mixture of two or more dyes selected from the group of the formula



wherein

R is methyl, ethyl, hydroxyethyl, β-methoxyethyl or β-ethoxyethyl,

$R_1$ is hydrogen or methyl and

$R_2$ is hydrogen, methyl or methoxy, provided that $R_1$ and $R_2$ are both hydrogen in one of the elected dyes and provided that the dye present as the minor component is present to the extent of at least about 10% by weight.

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4,110,073

## FLUID AND STABLE DISPERSIONS OF ANIONIC DYESTUFFS

Hans Mollet, Reinach, and Wolfgang Rehmann, Basel, both of Switzerland, assignors to Ciba-Geigy AG, Switzerland

Continuation of Ser. No. 441,625, Feb. 11, 1974, abandoned, which is a continuation of Ser. No. 285,666, Sep. 1, 1972, abandoned. This application May 10, 1976, Ser. No. 684,736
Claims priority, application Switzerland, Sep. 10, 1971, 013314
Int. Cl.[2] C09B *67/00;* D06P *1/645*
U.S. Cl. 8—85 R 7 Claims

1. A fluid and stable anionic dyestuff dispersion having a viscosity of 3 to 500 centipoise comprising as essential components

(a) 10 to 50% by weight of at least one dispersed anionic dyestuff having a particle size below 5μ;

(b) 5 to 80%, relative to the amount of dyestuff, as a dispersing agent a mixture selected from the group consisting of:

(1) sodium lignin sulphonate and disodiumdinaphthylmethane-disulphonate,

(2) sodium lignin sulphonate and decyloxyacetic acid monoethanolamide, and

(3) disodiumdinaphthylmethanedisulphonate and sodium-dioctylsulphosuccinate; and

(c) 20 to 80% by weight of the dispersion of water.

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4,110,074

## MIXED CARBOXYLIC/SULFONIC ANHYDRIDES IN PEROXYGEN BLEACHING

Joseph H. Finley, Metuchen; John H. Blumbergs, Highland Park, and Clifford A. Erickson, Princeton, all of N.J., assignors to FMC Corporation, Philadelphia, Pa.

Filed Oct. 3, 1977, Ser. No. 838,902
Int. Cl.[2] D06I *3/02, 3/04*
U.S. Cl. 8—111 7 Claims

1. A process of removing soil and/or stains from fabrics by immersing the fabrics in a peroxygen bleach bath containing as a peroxygen activator, an anhydride of a carboxylic acid with a sulfonic acid selected from the formulae consisting of

$$R_1—(SO_2OC(O)—R_2)_n \text{ and } (R_1—SO_2OC(O))_n—R_2$$

wherein $n$ is an integer of 1 to 3; each of $R_1$ and $R_2$, which may be alike or different, is selected from the class consisting of a 1 to 3 valent hydrocarbon radical derived from an alkane of 1 to 16 carbon atoms, a cycloalkane of 3 to 7 carbon atoms and an arene of 6 to 12 aromatic carbon atoms while taken together $R_1$ and $R_2$ can complete an o-phenylene or an o-naphthalene ring, said hydrocarbon radicals optionally bearing 1 to 3 sub-

stituents selected from the class consisting of alkoxy of 1 to 16 carbon atoms on the arene, aliphatic carboxamido of 1 to 16 carbon atoms on the arene, alkyl of 1 to 16 carbon atoms on the arene, benzamido on the arene, nitro, chlorine, bromine and fluorine.

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## 4,110,075
## PROCESS FOR WASHING TEXTILES IN AN AUTOMATIC WASHING MACHINE, WORKING SUBSTANCES AND APPARATUS FOR ITS PERFORMANCE

**Richard Graf; Lieselotte Brodzina, both of Berlin; Rudolf Strobele, and Helmut Stache, both of Marl, all of Fed. Rep. of Germany, assignors to Bosch-Siemens Hausgerate GmbH, Munich and Chemische Werke Huls A.G., Marl, both of, Fed. Rep. of Germany**

**Filed Dec. 6, 1976, Ser. No. 747,420**

**Claims priority, application Fed. Rep. of Germany, Dec. 4, 1975, 2554592**

**Int. Cl.[2] B08B *3/00***

**U.S. Cl. 8—137** **22 Claims**

1. In a washing process for textiles in an automatic washing machine with loading of the textiles in the machine, adding of water, application of active washing substances, structural substances and bleaching agents, agitation of the textiles in the washing solution, pumping off the washing solution, and sequential rinse cycles, the combination therewith of adding the water after loading the textiles in the ratio of 1:4 to 1:30 kg textile to liters water, maintaining said active washing substances in pumpable form, each in a separate container in the washing machine, adding 0.5 to 3.5 g of active washing substances and 2 to 6.5 g of structural substances per liter of washing water, agitating the textiles at a predetermined temperature for a wash period of up to 50 minutes, pumping off the washing solution, and subjecting the textiles to two to five rinse cycles.

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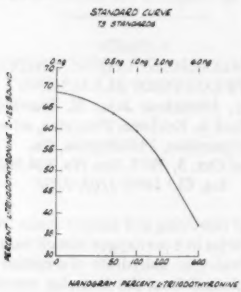
## 4,110,076
## RADIOIMMUNOASSAY METHODS FOR THE DETERMINATION OF L-TRIIODOTHYRONINE AND THYROXINE

**Salvatore S. Margherita, Manchester, Mo., assignor to Mallinckrodt, Inc., St. Louis, Mo.**

**Continuation of Ser. No. 590,671, Jun. 26, 1975, abandoned, which is a continuation-in-part of Ser. No. 464,345, Apr. 26, 1974, abandoned. This application Aug. 11, 1976, Ser. No. 713,447**

**Int. Cl.[2] G01N *33/16*; G21H *5/00***

**U.S. Cl. 23—230.6** **16 Claims**




1. A radioimmunoassay method for the in vitro determination of L-triiodothyronine in unextracted blood serum which comprises the steps of

mixing a sample of blood serum whose L-triiodothyronine content is to be determined with a reagent consisting essentially of a buffered solution containing radioactive L-triiodothyronine and an inhibitor for inhibiting binding of L-triiodothyronine to thyroxine-binding globulin, said inhibitor being selected from the group consisting of the magnesium, calcium and alkali metal salts of 8-anilino-1-naphthalene sulfonic acid;

adding to the mixture an antiserum containing antibody capable of immunoreactivity with L-triiodothyronine;

incubating the resultant mixture at a temperature and for a sufficient period of time to produce substantial equilibration of the antibody bound L-triiodothyronine and unbound L-triiodothyronine;

separating the unbound L-triiodothyronine from the antibody bound L-triiodothyronine; and

determining the relative amounts of antibody bound radioactive L-triiodothyronine and unbound radioactive L-triiodothyronine.

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## 4,110,077
## DETERMINATION OF β-LIPOPROTEINS IN BLOOD SERUM WITH POLYANETHOLE SULFONATE

**Bernard Klein, New Hyde Park, N.Y., and James Arthur Foreman, Montclair, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Filed Oct. 8, 1976, Ser. No. 731,057**

**Int. Cl.[2] G01N *33/16, 31/02, 21/22***

**U.S. Cl. 23—230 B** **3 Claims**

1. In a process of isolating beta-lipoproteins from blood serum by contacting serum with a polyanion in the presence of a divalent cation, the improvement which comprises obtaining said beta-lipoproteins in about 99% purity and substantially free of chylomicrons by:

(a) contacting blood serum with a sufficient amount of a solution containing about 0.5% by weight polyanethole sulfonate and from about 0.05 to about 0.15 mole per liter of a divalent cation to precipitate the beta-lipoproteins therein substantially free of chylomicrons;

(b) forming a solution of said beta-lipoproteins and reprecipitating them with said divalent cation to further purify them; and

(c) passing a solution of said beta-lipoproteins through a DEAE-cellulose column to effect immunochemical purification thereof.

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## 4,110,078
## BINARY REAGENT SYSTEM FOR DETECTING DRUGS OF ABUSE

**Paul Thomas Zelonis, 7926 Peak Point Ave., San Diego, Calif. 92126**

**Filed Nov. 26, 1976, Ser. No. 745,083**

**Int. Cl.[2] G01N *21/06, 31/02, 33/16***

**U.S. Cl. 23—230 R** **22 Claims**

1. A highly specific binary reagent system for detecting the presence, in a sample, of a drug of abuse selected from the group consisting of opium, heroin, phencyclidine, phencyclidine analogues, methadone and cocaine, comprising:

(a) a first reagent comprising chloroplatinic acid in aqueous solution;

(b) a second reagent comprising cobaltous thiocyanate in aqueous solution, and

(c) a hydrocarbon liquid.

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## 4,110,079
## ANALYTICAL ELEMENT FOR CLINICAL ANALYSIS

**James R. Schaeffer, Penfield; Louis M. Minsk, Rochester, and Richard E. Stevens, Penfield, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jun. 9, 1977, Ser. No. 805,215**

**Int. Cl.[2] G01N *31/22***

**U.S. Cl. 23—253 TP** **10 Claims**

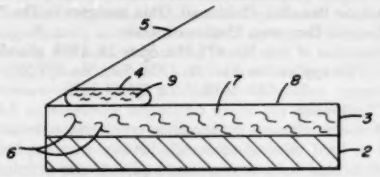
1. An analytical element for the assay of an aqueous liquid sample, said element comprising

(a) a porous layer structure in which said assay is carried out, said structure being one or more layer compositions se-

lected from the group consisting of porous paper or fabric compostions, permeable polymer film compositions, particle-containing compositions having interconnected open spaces between said particles, and mixtures of the foregoing compositions; said porous layer structure comprising

(i) a porous layer bearing a substantially planar sample receiving surface to receive said liquid sample from an external source, said porous layer having a layer composition selected from the group defined in (a) hereinabove.

(ii) at least one dry reagent material for use in said assay, said reagent material being contained in said porous layer or in a separate porous reagent layer having a




layer composition selected from the group set forth in (a) hereinabove, and

(iii) at least one reaction zone comprising a portion of said porous layer, or said porous reagent layer, or a separate porous layer having a composition selected from the group set forth in (a) hereinabove, at least one reaction employed in said assay being carried out in said reaction zone, each of said porous layer, said porous reagent layer, and said reaction zone being in fluid contact with one another; and

(b) a rupturable pod-like member containing a liquid reagent for said assay, said member being associated with said reaction zone whereby said liquid reagent, upon rupture of said member, is released into said reaction zone.

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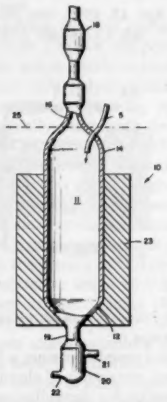
**4,110,080**

## REACTIVE ATMOSPHERIC PROCESSING CRYSTAL GROWTH APPARATUS

**Antonio C. Pastor, Santa Monica, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.**

**Filed Nov. 19, 1976, Ser. No. 743,263**
**Int. Cl.[2] B01J** *17/20*
**U.S. Cl. 23—273 SP** **4 Claims**




1. Crystal growth apparatus comprising:

an ampoule having a vertically elongated wall defining a chamber for receiving a crystal growth source material wherein said chamber converges at its lower end to form a seeding cavity at its bottom characterized by a conical first section and a capillary second lower section;

said wall being integrally joined at the bottom end to a heat sink having an inlet and an outlet means adapted for receiving a coolant and being integrally joined at the upper end to a passageway for introducing gases and a passageway for removing gases from said chamber; said passageway for removing gases including first and second series connected traps of a diameter larger than the portions of said passageway leading to, from and interconnecting same, whereby liquid and solid condensates are precluded from re-entering said chamber;

and insulation means surrounding said wall intermediate said ends adapted for controlling heat losses occasioned by convection and radiation upon the removal of said crucible from within a furnace during a crystal growth operation.

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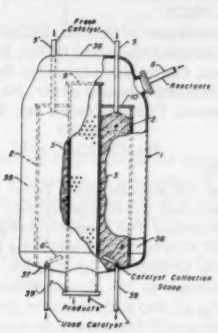
**4,110,081**

## MOVING-BED RADIAL FLOW SOLIDS-FLUID CONTACTING APPARATUS

**Robert F. Millar, McCook; Paul J. Persico, Bolingbrook, and Robert H. Jensen, Clarendon Hills, all of Ill., assignors to UOP Inc., Des Plaines, Ill.**

**Filed Jun. 9, 1977, Ser. No. 805,062**
**Int. Cl.[2] B01J** *8/12;* **B65G** *65/30*
**U.S. Cl. 23—288 G** **6 Claims**




1. A radial flow moving bed contact apparatus which comprises:

(a) a vertically oriented vessel having an internal volume located within a cylindrical side wall having an inner surface, the outer vessel having upper and lower sections;

(b) a first vertically oriented particle retaining screen located within the outer vessel a distance radially inward from the inner surface of the outer vessel and defining a fluid distribution volume between the first particle retaining screen and the outer vessel;

(c) a second vertically oriented particle retaining screen located within the first particle retaining screen a distance radially inward from the first particle retaining screen and defining an annular particle retention volume having an upper and a lower end and located between the first and the second particle retaining screens and also defining a cylindrical fluid collection volume located within the second particle retaining screen;

(d) a plurality of particle inlet conduits located in the upper section of the outer vessel and communicating with the upper end of the annular particle retention volume;

(e) a fluid inlet means communicating with the fluid distribution volume;

(f) a fluid outlet means communicating with the cylindrical fluid collection volume; and,

(g) a particle withdrawal means located between the first and the second particle retention screens at the lower end

of the annular particle retention volume, the particle withdrawal means comprising:

(i) a plurality of vertical tubular particle withdrawal conduits distributed in a circular pattern encircling the second particle retention screen, each particle withdrawal conduit having an unsealed upper end which communicates with the annular particle retention volume; and,

(ii) a plurality of particle collection scoops, each scoop having an open upper first end which faces the second particle retention screen and a lower second end which is attached to the upper end of a particle withdrawal conduit, the upper first end of each particle collection scoop being located between the lower second end of the particle collection scoop and the second particle-retaining screen, with one particle collection scoop being positioned over each of the particle withdrawal conduits, each particle collection scoop having a greater cross-sectional area at the upper first end than at the lower second end, and with each particle collection scoop comprising vertically spaced apart upper and lower planar panels reposing at an angle of from about 50°–60° above horizontal.

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**4,110,082**

## REFORMED HYDROCARBONS AND ALCOHOLS FROM FUEL ALLOYS AND REFORMING AGENTS

**Van Michaels-Christopher, 1817½ N. Las Palmas Ave., Hollywood, Calif. 90028**

**Continuation-in-part of Ser. No. 552,802, Feb. 25, 1975, abandoned, Continuation-in-part of Ser. No. 655,275, Feb. 4, 1976, abandoned, Continuation-in-part of Ser. No. 735,110, Oct. 22, 1976, Continuation-in-part of Ser. No. 445,792, Feb. 25, 1974, abandoned. This application Jan. 31, 1977, Ser. No. 764,283**

**Int. Cl.² C10L *1/10***

**U.S. Cl. 44—50** **4 Claims**

1. A process for manufacturing liquid hydrocarbons from repeatedly quenched hydrogenating fuel alloys which comprises the introducing into a reactor having a temperature of 500° C. to 1000° C. a feed stock including a powdered mixture of iron halides, oxides, and hydroxides, 50–60% powdered manganese oxides, 3 to 5% chromium and molybdenium oxides introducing air into said reactor to ignite and fluidize said mixture including sufficient carbon to produce carbon monoxide, which CO attacks said metal compounds below their melting points converting them catalytically to fuel alloys at atmospheric pressure through the evolved catalysing and self-catalyzing iron halide steam and the obtained $CO_2$ serving to increase the efficiency of the CO by reducing its partial pressure favouring faster and better yield of hydrocarbonides (liquid hydrocarbon evolving carbides) said fuel alloy being only primary one composed of different low yield manganese and iron hydrocarbonides and no hydrocarbons evolving carbides not containing cementite, the best hydrocarbonide the primary powder alloys being then passed into a cooling oil bed for repeated quenching below 50° C. to convert all of the above mentioned carbides into high yield liquid hydrocarbon evolving cementite $Fe_3C$ and manganese tritacarbide $Mn_3C$ then passing this secondary alloy composed of $Mn_3C$, $Fe_3C$, carbon unreacted chromium and molybdenium oxides and some zinc oxide into a reactor together with a hydrolyzing liquid to evolve liquid and gaseous hydrocarbons accompanied with by product hydrogen some carbonyls and reduced Iron attained at self pressure of 200 to 300 atmospheres favouring a higher percentage of the liquid hydrocarbons then increasing at the end of the hydrolysis the reactor's temperature up to 250° C. to partially react the obtained hydrogen with previously unreacted CO gas stored for that purpose in order to obtain additional Hydrocarbons then again increasing the temperature of the reactor up to 400° C. to catalytically hydrogenate the remaining Carbon constituent of the alloy into another additional yield of liquid hydrocarbons stimulated by the Cr and Mo doping then separating the obtained gasoline fraction mixing it with 0.5 to 5% anti-micelle forming agents 10 to 30 percent Methanol and 1 to 8 percent water to reform the gasoline into high grade isothermic engine fuel for which the required methanol is obtained by the same process essentially by the same kind of fuel alloy by decreasing its Cr and Mo doping and increasing its promoted zinc doping and finally recycling the Halides the hydroxides and the metal oxides obtained with the hydrolysis into the original feed stock by drying them and by mixing them with fresh carbon powder ready to be used for a new cycle of hydrocarbon synthesis.

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**4,110,083**

## ABRASIVE COMPOSITION

**James John Benedict, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio**

**Continuation of Ser. No. 471,941, May 21, 1974, abandoned. This application Apr. 16, 1976, Ser. No. 677,592**

**Int. Cl.² A61K *7/16*; B24D *3/30***

**U.S. Cl. 51—295** **7 Claims**

1. A coated abrasive composition consisting essentially of:

(A) A hard mineral substance having a hardness on the Mohs' scale of 2 or more and a particle size of from about 1 to about 30 microns; and as a coating for said hard mineral substance,

(B) from about 2 to about 25% by weight, based on the weight of said hard mineral substance, of a cationic water-soluble polymer having a cationic charge density of at least 0.003 and a molecular weight of from about 500 to about 1,000,000, said polymer being selected from the group consisting of:

(a) polyacryloxyalkyl ammonium salts;
(b) polymethacryloxyalkyl ammonium salts;
(c) polyacryloamido alkyl ammonium salts;
(d) polyalkenyl ammonium salts;
(e) polyvinyloxy ammonium salts;
(f) polyvinylbenzyl ammonium salts;
(g) polydiallyl ammonium salts;
(h) polyvinyl pyridinium ammonium salts;
(i) polyvinylimidazolium salts;
(j) polyalkylation quaternaries; and
(k) poly condensation quaternaries.

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**4,110,084**

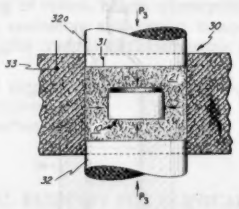
## COMPOSITE OF BONDED CUBIC BORON NITRIDE CRYSTALS ON A SILICON CARBIDE SUBSTRATE

**Minyoung Lee, Schenectady, and Lawrence E. Szala, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Apr. 15, 1977, Ser. No. 787,858**

**Int. Cl.² B24D *3/06***

**U.S. Cl. 51—307** **10 Claims**




1. A process for preparing an abrasive composite consisting essentially of the steps of:

a. placing within a metal container a layer of metal selected from the group consisting of aluminum, aluminum alloy, or alloying metals for providing said aluminum alloy, a layer of a mass of cubic boron nitride crystals, and a silicon carbide substrate, said substrate being disposed with one face or one side facing said layers and in contact with said layer of cubic boron nitride crystals, said aluminum

alloy containing aluminum in an amount of at least about 85% by weight of the alloy, said aluminum and aluminum alloy having a critical wetting temperature of less than about 1400° C., being capable of reducing $B_2O_3$ and exhibiting a limited finite reactivity with cubic boron nitride, the amount of said aluminum or aluminum alloy ranging from about 25% to about 60% by volume of said mass of cubic boron nitride crystals, said substrate consisting essentially of a hot-pressed or sintered polycrystalline silicon carbide body wherein the silicon carbide grains are bonded directly to each other by fusion only having a density ranging from about 85% to about 98% of the theoretical density of silicon carbide and containing silicon carbide in an amount of at least 90% by weight of said substrate body and being free of constituents which have a significantly deteriorating effect on any of the materials forming the present abrasive composite;

b. disposing said container and the contents thereof within a pressure-transmitting powder medium that remains at least substantially unsintered under the operating conditions of temperature and pressure and that transmits applied pressure substantially undiminished;

c. applying substantially isostatic pressure to said container and said contents via said pressure transmitting medium, said applied pressure ranging from about 20,000 psi to about 200,000 psi, the application of pressure being maintained at least long enough to substantially stabilize the dimensions of said container and said contents at least in planes through said container parallel to the interface between the layers of metal and cubic boron nitride crystals producing a substantially isostatic system of powder-enveloped container and contents wherein the density of cubic boron nitride crystals is higher than 70% by volume of the volume of said mass of cubic boron nitride crystals,

d. substantially evacuating said isostatic system including said container;

e. introducing a nitrogen gas atmosphere into said evacuated system including said container;

f. simultaneously applying pressure and heat to the resulting isostatic system of powder enveloped container to pass said aluminum and aluminum alloy through the voids in said mass of CBN crystals and into the contacting face or side of said silicon carbide substrate to a depth at least about twice the thickness of said layer of cubic boron nitride crystals, said pressure ranging from about 500 psi to about 100,000 psi and said heating being to a temperature ranging from the critical wetting temperature of said aluminum and aluminum alloy to about 1450° C.;

g. maintaining sufficient pressure on the resulting isostatic system during cooling thereof to maintain the dimensions of said container and

h. recovering the resulting abrasive composite.

6. A cubic boron nitride abrasive composite consisting of a layer of a mass of cubic boron nitride crystals bonded to each other and to a substrate of a polycrystalline silicon carbide body with an aluminum atom-containing phase infiltrated at least substantially and usually completely through said layer of crystals and diffused as an aluminum atom-containing phase rich in aluminum through the contacting surface of said silicon carbide body around the grains and through the pores therein to a depth of at least about twice the thickness of said layer of bonded cubic boron nitride crystals, said layer of bonded cubic boron nitride crystals consisting essentially of cubic boron nitride crystals wherein the density of said crystals ranges from higher than 70% by volume to about 90% by volume of said layer and said aluminum atom-containing phase in an amount less than 30% by volume of said layer with at least a significant portion of said aluminum atom-containing phase in said layer being aluminum nitride present in sufficient amount to at least bond said cubic boron nitride crystals together, said layer of bonded cubic boron nitride crystals containing voids up to less then 2% by volume of said layer, said voids having no significant deteriorating effect on the mechanical properties of said layer, said polycrystalline silicon carbide body being a hot-pressed or sintered body wherein the silicon carbide grains are bonded directly to each other by fusion only ranging in density from about 85% to about 98% of the theoretical density of silicon carbide and containing silicon carbide in an amount of at least 90% by weight of said body and being free of constituents which have a significantly deteriorating effect on the mechanical properties of said composite.

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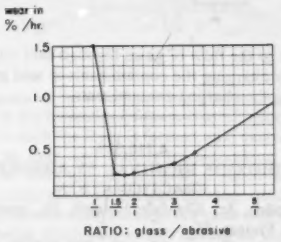
**4,110,085**

## GLASS BONDED FINISHING MEDIA

**Gunther W. Balz, Kalamazoo, Mich., assignor to Roto-Finish Company, Kalamazoo, Mich.**

**Filed Jul. 12, 1976, Ser. No. 704,390**
**Int. Cl.² B24D *3/14***
**U.S. Cl. 51—308** **23 Claims**




1. An abrasive finishing chip suitable for use as an abrasive medium in finishing processes and apparatus for the finishing of parts and workpieces, comprising abrasive grains dispersed in a matrix of sintered ground glass having a working point below about 1950° F. with a glass to abrasive weight ratio of about 1:1 to about 3.5:1 and of a shape suitable for employment as an abrasive media chip.

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**4,110,086**

## METHOD FOR IONIZING GASES, ELECTROSTATICALLY CHARGING PARTICLES, AND ELECTROSTATICALLY CHARGING PARTICLES OR IONIZING GASES FOR REMOVING CONTAMINANTS FROM GAS STREAMS

**James J. Schwab, Seattle, and David B. Goodson, Renton, both of Wash., assignors to Air Pollution Systems, Inc., Kent, Wash.**

**Continuation-in-part of Ser. No. 498,409, Aug. 19, 1974, abandoned. This application Aug. 4, 1976, Ser. No. 711,494**
**Int. Cl.² B03C *3/14***
**U.S. Cl. 55—7** **30 Claims**

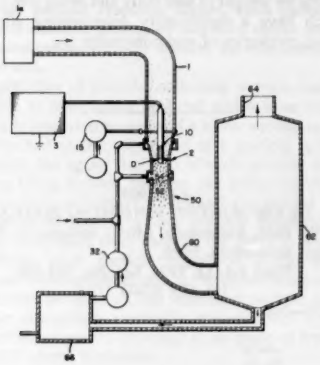
1. A method of removing contaminants from gases, comprising:

directing the contaminated gases through a tubular outer electrode;

placing an inner electrode with said outer electrode thereby forming an electrode gap between said electrodes;

generating an electrostatic field between said electrodes, the intensity of said field being approximately equal to the intensity of the average applied field throughout a distance from said outer electrode at least to about fifty percent of the electrode gap toward said inner electrode

such that said field is substantially uniform and is generally wedge shaped diverging outwardly in a direction perpendicular to the flow of gases through said outer electrode, thereby charging the contaminants in said gases; and collecting the charged contaminants.



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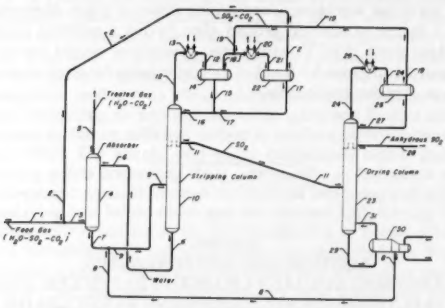
**4,110,087**

## SULFUR DIOXIDE REMOVAL BY ABSORPTION AND FRACTIONATION

**John P. Nolley, Jr., Glendale Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.**

**Continuation-in-part of Ser. No. 738,407, Nov. 2, 1976, abandoned. This application Sep. 12, 1977, Ser. No. 832,486**
**Int. Cl.[2] F25J *3/08;* B01D *53/14, 3/14***
**U.S. Cl. 55—73** **10 Claims**



1. A process for removing sulfur dioxide from a gaseous feed stream comprising water, sulfur dioxide and carbon dioxide which comprises the steps of:

(a) contacting the gaseous feed stream with a sulfur dioxide lean absorbent stream comprising water in an absorption zone operated at conditions effective to produce a sulfur dioxide rich absorbent stream comprising carbon dioxide and an off-gas stream containing less sulfur dioxide than the gaseous feed stream;

(b) passing the sulfur dioxide rich absorbent stream into a first intermediate point of a first fractionation column having a rectification section and a stripping section and operated at conditions effective to cause the separation of water and sulfur dioxide by fractionation including (1) a bottom temperature within 20 Fahrenheit degrees of the boiling point of water at the pressure imposed at the bottom of the first fractionation column, and (2) the retention of liquid sulfur dioxide on fractionation trays located above the first intermediate point and the retention of liquid water on fractionation trays located below the first intermediate point;

(c) passing at least a portion of a sulfur dioxide lean water stream removed as a bottoms product of the first fractionation column into the absorption zone as the sulfur dioxide lean absorbent stream;

(d) removing a first liquid sidecut stream comprising sulfur dioxide from the first fractionation column at a second, higher intermediate point;

(e) partially condensing an overhead vapor stream comprising sulfur dioxide and carbon dioxide withdrawn from the first fractionation column to form a first condensate stream comprising sulfur dioxide and a first vapor stream comprising carbon dioxide and sulfur dioxide;

(f) admixing the first vapor stream with a hereinafter described second vapor stream and partially condensing the resultant admixture to form a third vapor stream comprising sulfur dioxide and carbon dioxide and a second condensate stream comprising sulfur dioxide;

(g) passing the first and the second condensate streams into the first fractionation column as reflux liquid;

(h) passing the third vapor stream into the absorption zone and contacting the third vapor stream with the sulfur dioxide lean absorbent stream;

(i) passing the first liquid sidecut stream into a first intermediate point of a second fractionation column having a rectification section and a stripping section and operated at conditions effective to cause the separation of water and sulfur dioxide by fractionation including the retention of liquid sulfur dioxide on fractionation trays located above the first intermediate point;

(j) removing a second liquid sidecut stream comprising anhydrous sulfur dioxide from the second fractionation column at a second, higher intermediate point;

(k) passing a bottoms liquid product stream comprising water and sulfur dioxide and removed as a bottoms product of the second fractionation column into the first fractionation column;

(l) partially condensing an overhead vapor stream comprising sulfur dioxide and carbon dioxide and removed from the second fractionation column to form reflux liquid returned to the second fractionation column and a fourth vapor stream comprising sulfur dioxide and carbon dioxide; and,

(m) admixing the fourth vapor stream with the first vapor stream as the previously specified second vapor stream.

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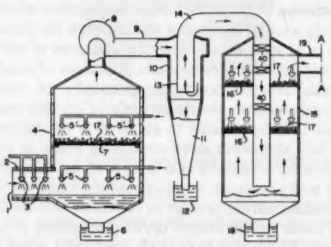
**4,110,088**

## APPARATUS AND METHOD FOR REMOVAL OF POLLUTANTS FROM FLUE GAS

**David M. Cold, 18610 Hanna Rd., Lutz, Fla. 33549, and Larry A. Bean, 100 Irwin St., Safety Harbor, Fla. 33572**

**Filed Jun. 18, 1976, Ser. No. 697,622**
**Int. Cl.[2] B01D *50/00***
**U.S. Cl. 55—90** **6 Claims**



1. A combination of apparatus for the removal of pollutants from flue gas comprising:

(a) a prequencher embodying a series of water sprays

adapted to impart a water spray for preliminary cooling and quenching of hot flue gas passing therethrough, said prequencher having an inlet adapted to receive said flue gas and an exit for said flue gas;

(b) a primary spray chamber having two series of sprayheads, each series being adapted to spray water through the entire horizontal cross-sectional area of said chamber with one series of sprayheads being positioned vertically above the second series, said chamber having an inlet means for receiving prequenched flue gas from said prequencher and and outlet means;

(c) a first pump positioned at and communicating with the outlet means of said chamber and adapted to provide a negative pressure in said primary spray chamber thereby to induce gas flow in said chamber and to provide a positive pressure on the downstream side of said pump;

(d) a first conduit means connected to the downstream side of said first pump;

(e) a cyclone separator having an inlet connected to said first conduit means and designed to induce centrifugal force and a downward path in the flow of gas therethrough, said separator having a bottom adapted to receive water and particulate matter depositing out of said gas and adapted to exit such material without releasing the gas pressure maintained therein, and said separator having an exit for the gas flowing therethrough, said exit being positioned at a point substantially lower than the inlet to said separator;

(f) a second conduit means for leading exit gas from said cyclone separator;

(g) a partially packed tower having a gas inlet means near the bottom thereof communicating with said second conduit means and adapted to receive said exit gas from said cyclone separator in a lower region of said partially packed tower, said tower having a gas outlet means in an upward region of said tower and having at least two porous trays vertically interposed between said gas inlet means and said gas outlet means and each said tray occupying the entire cross-sectional horizontal area of said tower so that said gas passes through the pores of said trays, and each said tray having a layer of packing thereon having a height of at least one inch,

(h) a demister having a gas inlet means communicating with and adapted to receive exit gas from said tower, said demister comprising a closed compartment having a gas outlet means remote from said gas inlet means and having interposed between said gas inlet means and said gas outlet means a series of baffle plates adapted to cause the gas passing therethrough to reverse direction a number of times thereby to induce repeated impingement of said gas on the baffles and walls of said compartment and said demister having a means for removing water and particulate matter collected at the bottom of said compartment without releasing gas pressure in said compartment;

(i) a second pump positioned at and communicating with said demister gas outlet means and thereby adapted to receive gas exiting from said outlet means and to impart a positive pressure on the downstream side of said pump and also to induce gas flow from the upstream side into said demister;

(j) a third conduit means communicating with the downstream side of said second pump;

(k) a venturi connected to and communicating with said third conduit and adapted to receive gas from the downstream side of said pump, said venturi having an outlet means and adapted to deliver gas through said outlet means at a much greater linear velocity than the linear velocity at which said gas enters said venturi; and

(l) a vertical stack positioned above said venturi and adapted to receive gas exiting from said venturi, said stack having an opening therein adjacent to said venturi outlet with said opening adapted to have air drawn into said stack by virtue of the aspirating effect of the velocity of gas emanating from said venturi.

**4,110,089**

## APPARATUS WITH FOAM BREAKER

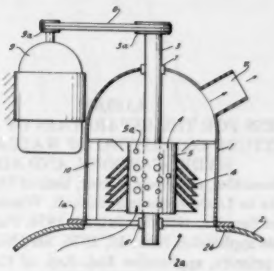
**Hans Müller, Erlenbach, Switzerland**

**Continuation of Ser. No. 573,527, May 1, 1975, abandoned. This application Dec. 23, 1976, Ser. No. 754,093**

**Claims priority, application Switzerland, May 13, 1974, 6530/74**

**Int. Cl.[2] B01D** *19/02*

**U.S. Cl. 55—178** **6 Claims**



1. In an apparatus in which mixing of gaseous and liquid phases results in the formation of foam, a combination comprising a vessel in which the foam is formed, said vessel having an opening and an inlet and outlet; foam-breaking means for breaking up the foam into its constituent liquid and gaseous components, comprising an upright housing straddling said opening and communicating through the same with said vessel, said housing being dome-shaped and having an upper domed part and a lower cylindrical part, rotatable foam breakers located within said cylindrical part of said housing and having an upright axis of rotation, said foam breakers being upwardly convergent coaxial members axially spaced from and axially overlapping one another, and stationary vertical baffles mounted in said cylindrical part of said housing and having longitudinal edges facing toward but spaced from said members parallel thereto, said baffles being integral plates extending over the entire length of said members and outwardly surrounding and adjacent the same so that the foam entering said lower cylindrical part of said housing from said vessel and through said opening in an upward direction is prevented from smooth circulation further in said direction and into said domed part of said housing, and is forced to contact said foam breakers which separate the liquid phase of the foam from the gaseous phase thereof, and the liquid phase is flung against said baffles to thereafter run back in an opposite direction downwardly into said vessel through said opening whereas the gaseous phase of the foam is evacuated out of said housing; and means for rotating said foam breakers about said axis including a shaft extending in the interior of the housing and carrying said foam breakers, said shaft having at least a portion which is hollow and perforated, bearings journalling said shaft at axially spaced locations, and drive means for rotating said shaft about said axis.

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**4,110,090**

## METHOD OF FORMING OPTICAL FIBERS

**Richard M. Klein, Framingham, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.**

**Filed Mar. 2, 1977, Ser. No. 773,526**

**Int. Cl.[2] C03B** *37/02*

**U.S. Cl. 65—2** **3 Claims**

1. The process for forming an optical fiber which comprises heating a melt of a glass composition to selectively volatilize at least one component of said composition from the surface region of said melt to reduce the refractive index at said surface, and drawing the heated glass composition into an optical fiber comprising a cladding formed of material from said selectively volatilized surface region and a core comprising said

glass composition wherein said heating is carried out at a temperature of between about 1400° C. and about 1800° C. for a period of time sufficient to reduce the refractive index of said surface region by an amount of at least 0.02.

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**4,110,091**

## PROCESS FOR THE SEPARATION OF A GASEOUS MIXTURE CONSISTING OF WATER VAPOR, HYDROCARBONS, AND AIR

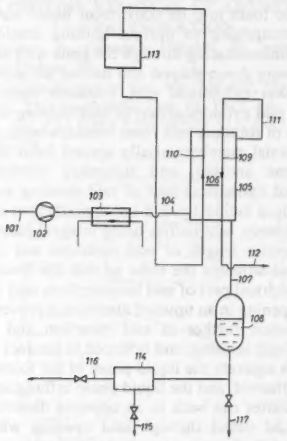
**Werner Daeschler, and Hans Rainer, both of Munich, Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Germany**

**Division of Ser. No. 490,876, Jul. 22, 1974, Pat. No. 3,967,938. This application Mar. 18, 1976, Ser. No. 667,998**

**Claims priority, application Fed. Rep. of Germany, Jul. 20, 1973, 2337055; Oct. 5, 1973, 2350115; Oct. 5, 1973, 2350114; Dec. 20, 1973, 2363504**

**Int. Cl.[2] F17C *7/02***

**U.S. Cl. 62—54** **6 Claims**




1. A process for the separation of components having a higher boiling point than air from a gaseous mixture consisting essentially of air, hydrocarbons and water vapor, comprising the steps of:

(a) passing said gaseous mixture to a heat exchanger provided with cooling tubes containing refrigerant cooled by a closed refrigeration cycle, said cooling of said gaseous mixture being conducted in a first stage within said heat exchanger to form a liquid condensate of water and hydrocarbons, and in a second stage within said heat exchanger to freeze out residual hydrocarbons and water to form solid deposits on the cooling tube surfaces;

(b) withdrawing cold, extensively purified air from the heat exchanger proximate the coldest zone thereof;

(c) recycling said cold, extensively purified air to said heat exchanger in a separate tube provided therein to cool, by indirect heat exchange, the entering gaseous mixture and warm said cold, extensively purified air;

(d) recovering the condensate water and hydrocarbons, and separating water therefrom to recover said hydrocarbons.

**4,110,092**

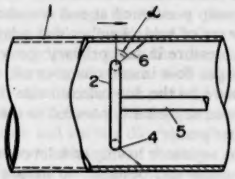
## METHOD OF APPARATUS FOR COOLING INNER SURFACE OF METAL PIPE

**Kazuo Kunioka; Takao Noguchi, both of Yokohama, and Hiroaki Sato, Tokyo, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 26, 1977, Ser. No. 762,954**

**Int. Cl.[2] F25B *17/02***

**U.S. Cl. 62—64** **6 Claims**




1. An improved method of cooling the inner surface of a metal pipe whereby in the process of continuously hardening said metal pipe by heating said metal pipe while travelling and then cooling the inner surface of said metal pipe, including the steps of: cooling said metal pipe by spraying a cooling fluid from a large number of nozzle openings formed in an annular cooling nozzle disposed in said metal pipe, selecting a spray direction of said cooling fluid from said nozzle openings for maintaining a dip angle in the range between 30° and 70° formed with the radial direction of the metal pipe on the side of the direction of travel of said metal pipe, said improvement comprising: directing said nozzle openings at a transverse angle in the range between 30° and 90° with respect to the radial direction of said metal pipe in a plane transverse to the direction of said pipe travel and imparting to said cooling fluid a jet velocity of greater than 5 meters per second for impingement onto a large number of points on the circumference of the inner wall of said metal pipe.

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**4,110,093**

## METHOD FOR PRODUCING AN IMPREGNATED WAVEGUIDE

**Pedro B. Macedo, 6100 Highboro Dr., Bethesda, Md. 20034, and Theodore A. Litovitz, 904 Devere Dr., Silver Spring, Md. 20903**

**Continuation-in-part of Ser. No. 462,481, Apr. 22, 1974, Pat. No. 3,938,974, and Ser. No. 559,512, Mar. 18, 1975, abandoned. This application Nov. 26, 1975, Ser. No. 635,728**

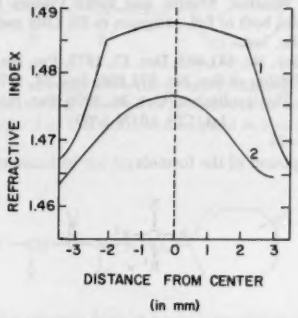
**The portion of the term of this patent subsequent to Feb. 17, 1993, has been disclaimed.**

**Int. Cl.[2] C03C *17/02, 15/00;* G02B *5/14***

**U.S. Cl. 65—3 R** **43 Claims**

1. In a method of producing an optical glass waveguide comprising adding at least one dopant capable of varying the index of refraction to a porous glass matrix with interconnective pores by immersing the porous glass matrix in a liquid/solution of the dopant to impregnate the porous glass matrix with the solution, precipitating the dopant from the solution within the porous glass matrix in the porous glass matrix, removing solvent from the porous glass matrix and collapsing the porous glass matrix to a solid form, the improvement which comprises

precipitating the dopant within the matrix before substantial evaporation of solvent, drying to remove solvent from the




pores to obtain after the steps of collapsing the porous glass matrix to a solid form an optical glass waveguide.

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**4,110,094**

## METHOD OF FORMING GLASS FIBER

**Donald L. Motsinger, Forest City, N.C., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Continuation of Ser. No. 513,208, Oct. 9, 1974, abandoned. This application May 10, 1977, Ser. No. 795,471**

**Int. Cl.² C03C** *25/02*

**U.S. Cl. 65—3 C** **6 Claims**

1. In the method of forming glass fiber strands useful for the reinforcement of resinous articles which comprises drawing glass streams through orifices in a bushing to form individual glass fibers, moving the fibers away from the bushing at a high rate of speed, applying an aqueous sizing solution thereto while they are moving at this speed and gathering the fibers into the form of the strand the improvement comprising:

applying as the aqueous sizing solution an aqueous sizing composition comprising a phenolic epoxy resin; the reaction product of a partial ester of a polycarboxylic acid containing one or more unesterified carboxyl groups with a compound containing more than one epoxy group;

a dual component emulsifier system having therein a polyethylene glycol emulsifier and a second emulsifier consisting essentially of the reaction product of propylene glycols and ethylene oxide;

a silane coupling agent and a saturated fatty triglyceride.

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**4,110,095**

## MANUFACTURE OF GLASS WHEREIN HOT METAL MOLDS ARE PROVIDED WITH A SOLID FILM LUBRICANT LAYER

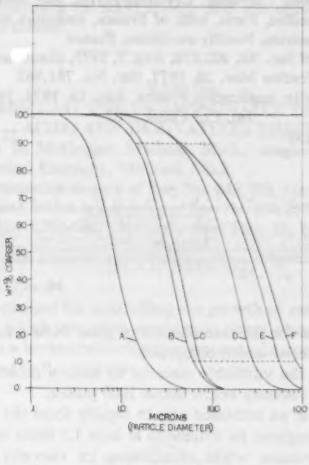
**Edward J. Stengle, Jr., Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio**

**Continuation of Ser. No. 562,554, Mar. 27, 1975, abandoned. This application Sep. 27, 1976, Ser. No. 727,322**

**Int. Cl.² C03C** *39/00*

**U.S. Cl. 65—26** **15 Claims**

1. In a process of forming a glass article wherein formable hot glass is formed into a blank by contact with a glass-forming, cavity-defining surface of a hot metal blank mold and said blank is then converted into said article by contact with a glass-forming, cavity-defining surface of a blow mold, and wherein said blank formation and said article formation is done without relative rotation of the glass and said molds, and wherein one of said glass-forming, cavity-defining surfaces is a solid layer comprising a solid lubricant dispersed in an organopolysiloxane binder, the improvement wherein said glass-forming, cavity-defining surface of said blank mold carries said solid layer and wherein said layer consists essentially of non-colloidal graphite, present in an amount sufficient to provide a glass releasing quality to said layer, an organopolysiloxane and up to




15% by weight, based on the organopolysiloxane, of a siloxane cure promoter.

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**4,110,096**

## METHOD OF PRECIPITATION OF A DOPANT IN A POROUS SILICATE GLASS

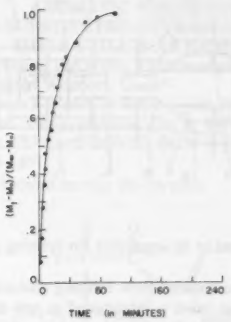
**Pedro B. Macedo, 6100 Highboro Dr., Bethesda, Md. 20034, and Theodore A. Litovitz, 904 Devere Dr., Silver Spring, Md. 20903**

**Continuation-in-part of Ser. No. 559,512, Mar. 18, 1975, abandoned, and Ser. No. 462,481, Apr. 22, 1974, Pat. No. 3,938,974. This application Nov. 26, 1975, Ser. No. 635,727**

**The portion of the term of this patent subsequent to Feb. 17, 1993, has been disclaimed.**

**Int. Cl.² C03C** *15/00, 17/00*

**U.S. Cl. 65—30 R** **25 Claims**

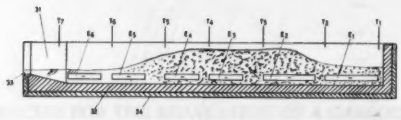



1. A process for producing a rigid glass product which comprises immersing a porous silicate glass having interconnected pores in a liquid solution of dopant in a liquid solvent therefor to stuff the pores of said glass with said solution, said dopant being precipitatable from said solution, precipitating the dopant to provide a distribution of precipitated dopant within the pores of said glass, subsequently removing solvent from said pores while avoiding destruction of the integrity of the porous glass and avoiding upsetting said distribution of said dopant in said pores, and heating to collapse said pores containing said dopant.

## 4,110,097
## METHOD FOR THE MANUFACTURE OF GLASS

François Edmond Chevalier, Levallois-Perret, and Jean Marc Pierre Fenouillet, Paris, both of France, assignors to Saint-Gobain Industries, Neuilly-sur-Seine, France

Continuation of Ser. No. 602,670, Aug. 7, 1975, abandoned. This application Mar. 28, 1977, Ser. No. 781,962
Claims priority, application France, Aug. 14, 1974, 74 28188
Int. Cl.² C03B 5/02
U.S. Cl. 65—136 22 Claims



1. A process for the manufacture of glass from a foamable vitrifiable material which comprises:
(a) melting the vitrifiable material to form a molten mass having a viscosity below about 1000 poises;
(b) heating at an increased rate to rapidly foam the molten mass throughout its volume to at least 1.5 times its initial molten volume while maintaining its viscosity below about 1000 poises;
(c) controlling the heating until the foamed mass subsides to dissipate the foam while maintaining it at a viscosity below about 1000 poises; and
(d) recovering the fused liquid glass.

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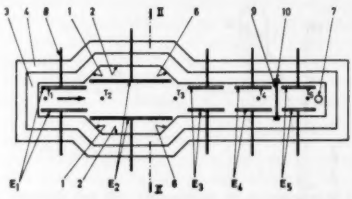
## 4,110,098
## MOLTEN GLASS REFINING APPARATUS

René Mattmuller, Malakoff, France, assignor to Saint-Gobain Industries, Neuilly-sur-Seine, France

Continuation-in-part of Ser. No. 602,670, Aug. 7, 1975, abandoned. This application Feb. 10, 1977, Ser. No. 767,390
Claims priority, application France, Feb. 12, 1976, 76 03813; Aug. 14, 1974, 74 28188
Int. Cl.² C03C 5/02
U.S. Cl. 65—141 17 Claims



1. The improvement in an apparatus for refining glass comprising:
(a) an elongated continuous flow refining channel in which a molten vitreous mass is introduced at one end thereof and flowed horizontally therethrough to an exit at its other end;
(b) a localized foaming zone extending along a predetermined length of said channel and spaced from the one end thereof, said foaming zone having a width appreciably wider than the channel upstream of said foaming zone; and
(c) heating means submerged along the length of said channel for subjecting the flowing molten mass in said foaming zone to an expansion of at least 50% of its initial molten volume by foaming the flowing molten mass in said foaming zone throughout its entire volume as the mass moves along the channel from its one end to the other end.

## 4,110,099
## NOVEL FLUOROALKOXYPHENYL-SUBSTITUTED NITROGEN HETEROCYCLES

Robert Lee Benefiel, Manila, and Eriks Viktors Krumkalns, Indianapolis, both of Ind. assignors to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 641,403, Dec. 17, 1975, Pat. No. 4,002,628, which is a division of Ser. No. 371,106, Jun. 18, 1973, Pat. No. 3,967,949. This application Oct. 26, 1976, Ser. No. 735,659
Int. Cl.² A01N 5/00
U.S. Cl. 71—76 12 Claims

1. A compound of the formula

wherein
R is 3-pyridyl,
$R^1$ is phenyl, pyridyl, $C_1$–$C_{12}$ alkyl or $C_3$–$C_8$ cycloalkyl;
$R^2$ is trifluoromethoxyphenyl, tetrafluoroethoxyphenyl, or pentafluoroethoxyphenyl;
X is hydroxy and lower alkoxy;
and the nonphytotoxic acid addition salts thereof.

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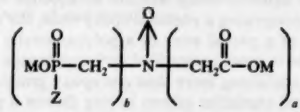
## 4,110,100
## PHOSPHINYLMETHYLIMINO-ACETIC ACID N-OXIDE COMPOUNDS AND THE SUCROSE INCREASING USE THEREOF

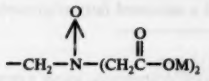
John E. Franz, Crestwood, Mo., and Reuven M. Sacher, Kraainem, Belgium, assignors to Monsanto Company, St. Louis, Mo.

Filed Aug. 12, 1977, Ser. No. 823,908
Int. Cl.² C07F 9/30, 9/48; A01N 9/36
U.S. Cl. 71—86 23 Claims

1. A compound of the formula



wherein Z is hydrogen, lower alkyl, phenyl or a



and M is hydrogen or an agriculturally acceptable salt-forming cation, *a* and *b* are the integers 1 or 2, the sum of $a + b$ being 3, provided that when Z is other than hydrogen, lower alkyl or phenyl, *a* is equal to 2.

9. A method for increasing the sucrose content of sugar cane plants which comprises applying to said plants, from about 2 to 10 weeks prior to harvest, an effective amount of a compound of claim 1.

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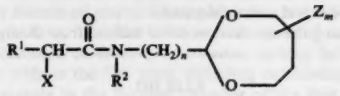
## 4,110,101
## DIOXEPANE SUBSTITUTED AMIDES

Leonard J. Stach, Riverside; Roger D. Hotz, Evanston, both of Ill., and Sidney B. Richter, Barberton, Ohio, assignors to Velsicol Chemical Corporation, Chicago, Ill.

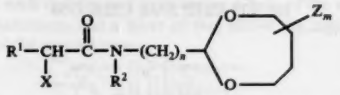
Filed Apr. 6, 1977, Ser. No. 785,007
Int. Cl.² C07D 321/06
U.S. Cl. 71—88 6 Claims

1. A compound of the formula



wherein $R^1$ is selected from the group consisting of hydrogen and lower alkyl; X is chlorine or bromine; $R^2$ is, lower alkenyl; *n* is the integer 1 or 2; Z is lower alkyl; and *m* is an integer from 0 to 4.

4. A compound of the formula



wherein $R^1$ is selected from the group consisting of hydrogen and lower alkyl; X is chlorine or bromine; $R^2$ is lower alkynyl; *n* is the integer 1 or 2; Z is lower alkyl; and *m* is an integer from 0 to 4.

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## 4,110,102
## METHOD AND COMPOSITION FOR TREATING TREES

**Richard Persons Pharis, c/o University of Calgary, Calgary, Alberta, Canada**

**Filed Mar. 18, 1976, Ser. No. 667,977**

**Claims priority, application United Kingdom, Apr. 3, 1975, 13742**

**Int. Cl.[2] A01N** *9/02, 5/00, 9/24*

**U.S. Cl. 71—89** **27 Claims**

1. A method of inducing the formation of strobili in trees of the family Pinaceae which comprises applying thereto a strobili-formation-inducing effective amount of an auxin and one or more gibberellins selected from gibberellins $A_3$, $A_4$, $A_5$, $A_7$, $A_9$ and $A_{14}$, the auxin being applied in a non-toxic amount and in a weight ratio to the gibberellin or gibberellins of at least 1 part by weight of auxin per 250 parts by weight of gibberellin, said auxin being selected from the group consisting of indolyl acetic acid, naphthalene acetic acid; phenoxyacetic acids; phenoxypropionic acids; phenoxybutyric acids; chlorine-substituted benzoic acids; salts thereof selected from sodium, potassium, ammonium, dimethylamine and ethanolamine salts and esters thereof selected from methyl, ethyl, propyl and butyl esters.

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## 4,110,103
## DIHYDROIMIDAZOISOINDOLEDIONES AND THE USE THEREOF AS HERBICIDAL AGENTS

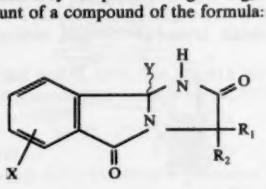
**Marinus Los, Pennington, N.J., assignor to American Cyanamid Company, Stamford, Conn.**

**Division of Ser. No. 631,356, Nov. 12, 1975, Pat. No. 4,041,045. This application Mar. 25, 1977, Ser. No. 781,234**

**Int. Cl.[2] A01N** *9/22*

**U.S. Cl. 71—92** **12 Claims**

1. A method for the control of undesirable plant species comprising applying to the foliage of the undesirable plants or the soil in which they are planted or growing, a herbicidally effective amount of a compound of the formula:



wherein X is H, $CH_3$, $NO_2$, Cl, $OCH_3$ or $SCH_3$; $R_1$ is alkyl $C_1$–$C_4$; $R_2$ is alkyl $C_1$–$C_6$, cycloalkyl $C_3$–$C_6$, alkenyl $C_2$–$C_4$, phenyl, halophenyl, or benzyl; and when $R_1$ and $R_2$ are taken together with the carbon to which they are attached. They may form cycloalkyl $C_3$–$C_6$ optionally substituted with methyl; Y is hydrogen, $—NR_3R_4$, $-OR_5$ or $—SR_6$; $R_3$, $R_4$, $R_5$ and $R_6$ are each hydrogen or alkyl $C_1$–$C_4$; and the optical and stereo isomers thereof.

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## 4,110,104
## HERBICIDAL USE OF AMINOHALOPYRIDYLOXY ACIDS AND DERIVATIVES THEREOF

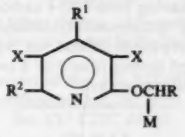
**Stanley D. McGregor, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Continuation-in-part of Ser. No. 342,783, Mar. 19, 1973, abandoned, which is a division of Ser. No. 166,257, Jul. 26, 1971, Pat. No. 3,761,486. This application Dec. 23, 1976, Ser. No. 753,753**

**Int. Cl.[2] A01N** *9/22*

**U.S. Cl. 71—94** **6 Claims**

1. A method for controlling the growth of undesirable plant species which comprises applying to plants, plant parts or their habitats a herbicidally effective amount of a compound corresponding to the formula



wherein X represents chloro or bromo; R represents carbamoyl (—$CONR^3R^4$) or carboxy (—COOH) or the carboxylic acid salts thereof; each of $R^3$ and $R^4$ independently represents hydrogen or alkyl of 1 to 8 carbon atoms; M represents hydrogen or loweralkyl; $R^1$ represents hydrogen, loweralkyl, amino or loweralkylamino of 1 to 4 carbon atoms; and $R^2$ represents hydrogen, X, loweralkyl, amino or loweralkylamino, with the proviso that one of $R^1$ or $R^2$ is amino or loweralkylamino and the other of $R^1$ or $R^2$ is always other than amino or loweralkylamino.

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## 4,110,105
## AROMATIC N-SUBSTITUTED HALO-SUBSTITUTED-2-PYRROLIDINONES AND THEIR UTILITY AS HERBICIDES

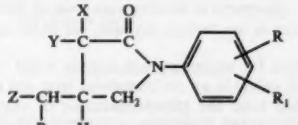
**Eugene G. Teach, El Cerrito, Calif., assignor to Stauffer Chemical Company, Westport, Conn.**

**Continuation-in-part of Ser. No. 563,279, Mar. 28, 1975, abandoned. This application Jan. 9, 1976, Ser. No. 647,963**

**Int. Cl.[2] C07D** *207/26;* **A01N** *9/22, 9/12, 9/14*

**U.S. Cl. 71—95** **28 Claims**

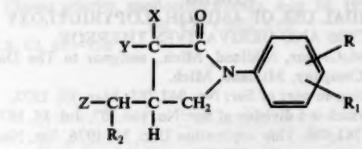
1. A compound having the formula



in which X is hydrogen, chlorine or methyl; Y is hydrogen, chlorine or bromine, Z is chlorine or bromine; $R_2$ is alkyl having from 1 to 4 carbon atoms, inclusive, or hydrogen; R is hydrogen, alkyl, acetyl, chlorine, bromine, fluorine, iodine, trifluoromethyl, nitro, cyano, alkoxy having from 1 to 4 carbon atoms, inclusive, alkylthio having from 1 to 4 carbon atoms, inclusive, alkylsulfinyl having from 1 to 4 carbon atoms, inclusive, alkylsulfonyl having from 1 to 4 carbon atoms, inclusive, trifluoromethylthio, trifluoromethylsulfinyl, trifluoromethylsulfonyl, penta fluoropropionamido or 3-methylureido; and $R_1$

is hydrogen, alkyl having from 1 to 4 carbon atoms, inclusive, chlorine or trifluoromethyl.

51. A method for controlling the growth of undesirable vegetation which comprises applying to at least one of (a) such undesirable vegetation and (b) their habitat, an herbicidally effective amount of a compound having the formula



in which X is hydrogen, chlorine or methyl; Y is hydrogen, chlorine or bromine, Z is chlorine or bromine; $R_2$ is alkyl having from 1 to 4 carbon atoms, inclusive, or hydrogen; R is hydrogen, alkyl, acetyl, chlorine, bromine, fluorine, iodine, trifluoromethyl, nitro, cyano, alkoxy having from 1 to 4 carbon atoms, inclusive, alkylthio having from 1 to 4 carbon atoms, inclusive, alkylsulfinyl having from 1 to 4 carbon atoms, inclusive, alkylsulfonyl having from 1 to 4 carbon atoms, inclusive, trifluoromethylthio, trifluoromethylsulfinyl, trifluoromethylsulfonyl, pentafluoroproprionamido, or 3-methylureido; and $R_1$ is hydrogen, alkyl having from 1 to 4 carbon atoms, inclusive, chlorine or trifluoromethyl.

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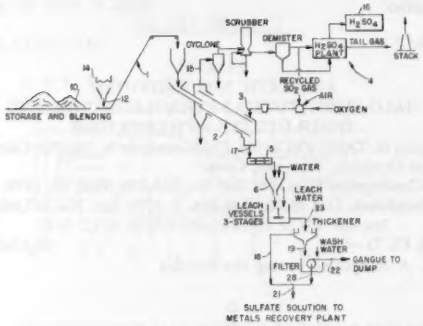
## 4,110,106
## SELECTIVE SULFATION PROCESS FOR PARTITIONING FERROUS AND NON-FERROUS VALUES IN AN ORE

**Theodore C. Frankiewicz, Littleton, Mass., assignor to Kennecott Copper Corporation, New York, N.Y.**

**Continuation of Ser. No. 657,849, Feb. 13, 1976, abandoned. This application Sep. 26, 1977, Ser. No. 836,493**

**Int. Cl.² C22B *1/06***

**U.S. Cl. 75—1 R** **28 Claims**




1. A process for separating non-ferrous metal values from ferrous metal values in an ore containing iron and at least one metal selected from the group consisting of copper, nickel cobalt, vanadium, and manganese, said process comprising the steps of:

mixing the ore, in particulate sulfide form, with a mixture of inorganic salts, which mixture has a melting point below the roasting temperature of the ore the ratio of salt mixture to ore being at least 0.05;

heating the ore and salt mixture to melt the salt mixture and to form a liquid salt coating on the ore;

contacting the ore coated with the liquid salt coating with a roaster gas comprising at least 1% $SO_2$ and $O_2$, the amount of $O_2$ being sufficient to convert non-ferrous metals to sulfates and the ferrous metals to $Fe_2O_3$, said contacting being conducted at a temperature above 650° C. and for a sufficient amount of time to produce non-ferrous metal sulfates and iron oxide; and

separating the non-ferrous metal sulfates from the iron oxide.

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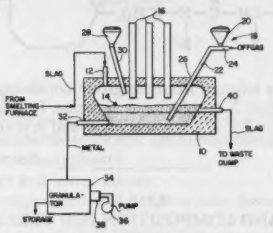
## 4,110,107
## PROCESS FOR REDUCING MOLTEN FURNACE SLAGS BY CARBON INJECTION

**Danton L. Paulson, Rolla, Mo., and Willard L. Hunter, Albany, Oreg., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.**

**Continuation-in-part of Ser. No. 806,989, Jun. 16, 1977, abandoned. This application Nov. 7, 1977, Ser. No. 848,851**

**Int. Cl.² C21B *3/04*; C22B *7/04***

**U.S. Cl. 75—24** **7 Claims**




1. A process for recovering metals from a molten slag by reducing the slag with carbon, said process comprising:

feeding the metal-containing molten slag to an electric furnace at a rate so as to maintain the slag in a molten state;

providing a molten metal bath beneath, and in contact with, the molten slag;

inserting an injector tube of a carbon injecting device into said furnace and injecting carbon through said injector tube into the bottom of the molten metal bath;

feeding a flux, as needed, to the molten slag;

tapping off the metal product; and

tapping off the residual slag.

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## 4,110,108
## METHOD OF PRODUCING CAST IRON

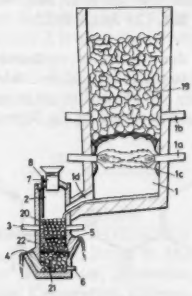
**Hans Günter Geck, Hagen, and Fritz Kruse, Dortmund-Brechten, both of Fed. Rep. of Germany, assignors to Klöckner-Werke AG, Duisburg, Fed. Rep. of Germany**

**Filed Mar. 16, 1977, Ser. No. 778,139**

**Claims priority, application Fed. Rep. of Germany, Mar. 18, 1976, 2611458**

**Int. Cl.² C21C *7/00***

**U.S. Cl. 75—48** **11 Claims**



1. A method of producing cast iron from scrap, sponge iron and similar iron-containing metallic substances, comprising the steps of accommodating a metallic substance in a first zone to

form a column therein having an exposed lower surface which upwardly bounds an empty burning chamber in the first zone; confining a body of solid carbonaceous material only in a second zone separate from said first zone; melting the melallic substance only in the first zone, including combusting a fuel-oxygen mixture in the burning chamber of the first zone to form an oxidizing flame therein which acts from below on the exposed lower surface of the column; conducting the molten metallic substance through said burning chamber of said first zone and into said second zone; passing the molten metallic substance in the second zone through the body of solid carbonaceous material for the molten metallic substance to become enriched with carbon; and maintaining a bath of the enriched metallic substance and a layer of slag above the latter at the bottom of the second zone.

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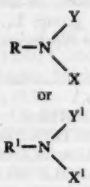
**4,110,109**

## OXIDATION INHIBITION OF STEEL WOOL IN SILVER RECOVERY

**Michael Golben, Maplewood, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.**

**Filed Oct. 27, 1977, Ser. No. 845,911**
**Int. Cl.[2] C22B *11/04***
**U.S. Cl. 75—109** **3 Claims**

1. In the process of reducing silver ions from a silver rich solution by contacting said silver rich solution with iron, the improvement which comprises contacting said silver rich solutions with said iron in the presence of a material which inhibits corrosion and hydrogen embrittlement of said iron, said material having no more than 50 carbon atoms and being represented by either of the formulae:



I)

or



II)

wherein

R and $R^1$ are abietyl, hydroabietyl, dehydroabietyl, or $C_4$-$C_{20}$ alkyl,

X is H or $-CH_2A$

Y is $-CH_2A$, and

A is an alpha ketonyl group

$X^1$ and $Y^1$ are $-(CH_2CH_2O)_mH$ and $-(CH_2CH_2O)_nH$ respectively wherein $m+n$ is at least 1 and $m$ and $n$ may each be 0 to 15.

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**4,110,110**

## NICKEL-BASE ALLOY EXCELLENT IN CORROSION RESISTANCE AT HIGH TEMPERATURES

**Tatsuo Kondo, Mito; Masami Shindo, Tokai; Taizo Ohmura; Noboru Yonezawa, both of Ohmiya; Akira Kawagoe, Kitamoto, and Toshio Kojima, Okegawa, all of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Otemachi, Japan**

**Filed Aug. 9, 1976, Ser. No. 712,760**
**Claims priority, application Japan, Aug. 27, 1975, 50-103047; Aug. 27, 1975, 50-103048**
**Int. Cl.[2] C22C *19/05***
**U.S. Cl. 75—122** **10 Claims**

1. A nickel-base alloy excellent in corrosion resistance at high temperatures, which consists essentially of, in weight percentage:

Carbon — 0.04 to 0.25%,

Chromium — 10.0 to 25.0%,

at least one element selected from the group consisting of 0.1 to 30.0% iron, 0.1 to 25.0% tungsten, 0.1 to 10.0% molybdenum and 0.05 to 30.0% cobalt, the maximum thereof being 50%,

Manganese — 0.4 to 1.5%,

Silicon — 0.05 to 0.5%,

Aluminium — 0.001 to 0.2%,

Titanium — 0.001 to 0.05%, and

Nickel and inevitable impurities — balance;

said alloy having excellent corrosion resistance at high temperatures in an atmosphere of a low oxidizing potential.

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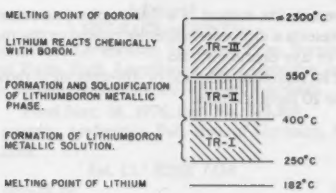
**4,110,111**

## METAL ALLOY AND METHOD OF PREPARATION THEREOF

**Frederick E. Wang, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Continuation-in-part of Ser. No. 377,671, Jul. 5, 1973, abandoned. This application Jul. 28, 1976, Ser. No. 710,055**
**Int. Cl.[2] C22C *24/00***
**U.S. Cl. 75—134 A** **2 Claims**




1. A metallic alloy of the formula $Li_xB_{1-x}$ where $0.30<x-<0.90$ and $x$ is the atomic fraction of lithium.

2. A method of preparing the alloy of claim 1 comprising:

(a) heating a mixture of elemental lithium and some crystalline boron to a temperature between about 250° C. and about 400° C.;

(b) maintaining said temperature for a time sufficient to effect complete dissolution of boron in the liquid lithium;

(c) raising the temperature of said solution to about 400° C. to about 550° C. to effect total solidification of the liquid solution; and

(d) keeping the temperature between about 530° C. and about 550° C. until an exotherm is observed;

provided that all of the steps are carried out in an inert atmosphere.

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**4,110,112**

## PHOTOSENSITIVE MATERIAL CONTAINING 2,3-DI(2,3-DIIODOPROPOXY)-PROPYL CELLULOSE AND USES THEREOF

**Alain Roman, Bossey; Jean-Pierre Sachetto, St. Julien-en-Genevois, both of France; Manfred Wust, Dardagny, and Sergio Cuccolo, Geneva, both of Switzerland, assignors to Neste Oy, Espoo, Finland**

**Filed Jun. 23, 1977, Ser. No. 809,452**
**Int. Cl.[2] G03C *5/24, 1/00***
**U.S. Cl. 96—1 PC** **20 Claims**

1. Photosensitive material comprising a substrate at least one surface portion of which contains uniformly distributed 2,3-di-(2,3-diiodopropoxy)-propyl cellulose.

## 4,110,113
## SULFONAMIDO DYE RELEASER IN PHOTOGRAPHIC DYE DIFFUSION TRANSFER

**Arnfried Melzer; Paul Marx, both of Cologne, and Walter Püschel, Leverkusen, all of Fed. Rep. of Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

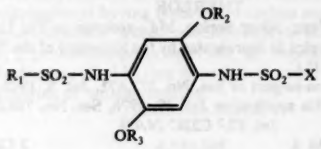
**Continuation of Ser. No. 547,433, Feb. 6, 1975, abandoned. This application Jun. 16, 1977, Ser. No. 807,078**

**Claims priority, application Fed. Rep. of Germany, Feb. 12, 1974, 2406664**

**Int. Cl.² G03C *7/00, 5/54, 1/40, 1/10***

**U.S. Cl. 96—29 D** **3 Claims**

2. A photographic material comprising on a support at least one photosensitive silver halide emulsion layer and, associated with that layer, a non-diffusible dye-giving sulfonamidoaryl compound which, on oxidation by the oxidation product of a photographic developer compound, is split by developer alkali to release a diffusible dye or dye precursor carrying a sulfonamide group, the non-diffusible sulfonamidoaryl compound corresponding to the following formula:



in which

X represents the radical of a dye or dye precursor;

$R_1$ represents a diffusion-inhibiting radical or the radical of a dye or dye precursor; and

$R_2$ and $R_3$ represent identical or different alkyl radicals with up to 20 carbon atoms.

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## 4,110,114
## IMAGE FORMING METHOD

**Masamichi Sato, Asaka, Japan, assignor to Fuji Photo Film Co., Ltd., Minami Ashigara, Japan**

**Filed Oct. 14, 1975, Ser. No. 622,330**

**Claims priority, application Japan, Oct. 11, 1974, 49-117280**

**Int. Cl.² G03C *5/00, 7/00***

**U.S. Cl. 96—36** **33 Claims**

1. A method for producing an image comprising forming silver image and non-silver image areas on a photographic material which comprises a substrate having thereon at least one silver halide emulsion layer, either directly or at least one subbing layer on the substrate, by exposing and developing said photographic material, heating the material at 150° to 600° C and then ion bombarding said material to imagewise ion-etch away the layer or layers above the substrate to remove the non-silver image areas of the emulsion layer without completely removing the silver image areas.

8. The method of claim 7, wherein said silver halide emulsion is an emulsion containing about 90 mole% or more silver bromide and not more than about 5 mole% silver iodide, where the mean grain size of the silver halide grains is not more than about 0.1 micron, and wherein the weight ratio of the silver halide to the water-soluble binder of the emusion is about 1:4 to about 6:1.

## 4,110,115
## PHOTOGRAPHIC LIGHT-SENSITIVE ELEMENT HAVING DYED LAYER

**Masatoshi Sugiyama, and Eiichi Kato, both of Minami Ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami Ashigara, Japan**

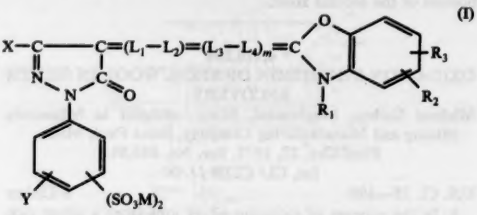
**Filed May 5, 1977, Ser. No. 794,186**

**Claims priority, application Japan, May 6, 1976, 51-51452**

**Int. Cl.² G03C *1/84***

**U.S. Cl. 96—84 A** **21 Claims**

1. A silver halide photographic light-sensitive element containing at least one hydrophilic colloid layer containing at least one basic polymer and at least one merocyanine dye represented by the following general formula (I):



(I)

wherein X represents an alkyl group, an aralkyl group, an aryl group, an alkoxy group, a hydroxy group, an amino group, a carboxy group or an alkoxycarbonyl group; Y represents a hydrogen atom, a halogen atom, a lower alkyl group, a hydroxy group or a sulfo group; $R_1$ represents an alkyl group; $R_2$ and $R_3$, which may be the same or different, each represents a hydrogen atom, a halogen atom, an alkyl group, an alkoxy group or an alkoxycarbonyl group; $L_1$, $L_2$, $L_3$ and $L_4$ each represents a methine group; *m* represents 0 or 1; and M represents a cation.

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## 4,110,116
## FOGGED DIRECT POSITIVE SILVER HALIDE EMULSION CONTAINING A CYANINE DYE HAVING AT LEAST ONE BENZOXAZOLE OR BENZOTHIAZOLE NUCLEUS SUBSTITUTED WITH HALOGEN ATOMS

**Paolo Beretta, Savona, and Luigi Valbusa, Savona, both of Italy, assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.**

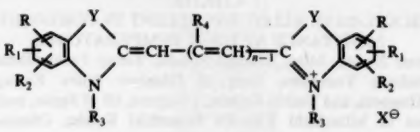
**Continuation-in-part of Ser. No. 478,616, Jun. 12, 1974, abandoned. This application Mar. 16, 1977, Ser. No. 778,135**

**Claims priority, application Italy, Jun. 18, 1973, 50883 A/73**

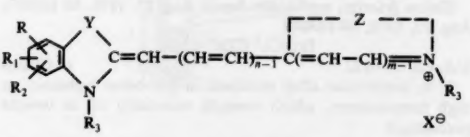
**Int. Cl.² G03C *1/36, 1/28, 1/18***

**U.S. Cl. 96—101** **13 Claims**

1. A light-sensitive fogged direct positive silver halide emulsion containing a sensitizing amount of at least one cyanine dye selected from the formulae:



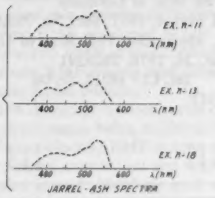
or

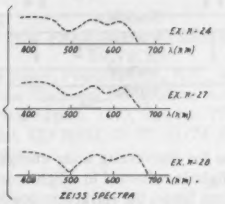


wherein

Y is an oxygen or sulfur atom,

$n$ is 2, 3, or 4,
$m$ is 1 or 2,
R and $R_1$ are independently halogen atoms,
$R_2$ is H or an alkyl group of 1 to 4 carbon atoms,
$R_3$ is selected from the group consisting of acylic hydrocarbon, alkyl-aryl, or aryl groups,




$R_4$ is H or alkyl of 1 to 3 carbon atoms,
Z represents the non-metallic atoms required to complete a 5 or 6 membered desensitizing heterocyclic nucleus, and
X is an acid anion.

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**4,110,117**
## COATING COMPOSITION

**Gordon D. McLeod, Adrian, Mich., assignor to Mobil Oil Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 559,750, Mar. 19, 1975, Ser. No. 542,837, Jan. 21, 1975, Ser. No. 532,152, Dec. 12, 1974, Ser. No. 409,067, Oct. 24, 1973, Ser. No. 284,099, Aug. 28, 1972, Ser. No. 283,964, Aug. 28, 1972, Ser. No. 107,578, Jan. 18, 1971, abandoned, and Ser. No. 75,306, Sep. 24, 1970, abandoned, said Ser. No. 409,067, is a continuation-in-part of Ser. No. 107,578, , which is a continuation-in-part of Ser. No. 75,306, , said Ser. No. 284,099, is a continuation-in-part of Ser. No. 107,578, , and Ser. No. 75,306,. This application Oct. 29, 1975, Ser. No. 626,624**

**Int. Cl.[2] C09D** *5/10*

**U.S. Cl. 106—1.17** **10 Claims**

1. A coating composition containing:
(1) metallic zinc in particulate form;
(2) a corrosion inhibitive composition selected from the group consisting of a mixture of zinc chromate and a finely divided magnesium silicate, a mixture of zinc chromate and a finely divided calcium silicate, a mixture of zinc chromate and a finely divided magnesium carbonate, and a mixture of zinc chromate and a finely divided calcium carbonate;
(3) an aliphatic polyol silicate; and
(4) a liquid organic vehicle;
said coating composition containing from about 4 to about 95% by weight of said metallic zinc, from about 1 to about 80% by weight of said corrosion inhibitive composition, and from 1% to about 70% by weight of said aliphatic polyol silicate, said weight percentages being based on the coating composition without said liquid organic vehicle;
said aliphatic polyol silicate being a solvent soluble, ester-exchanged reaction product of (1) an organic silicate consisting essentially of ortho silicates having ester-exchangeable groups 1 to 6 carbon atoms, said ester-exchangeable groups selected from the group consisting of alkyl, hydroxy alkyl, alkoxy alkyl, and hydroxyalkoxy alkyl; siloxanes thereof, and their mixtures and (2) an aliphatic polyol that is ester-exchangeable with (1), said aliphatic polyol silicate reactants present in amounts providing a ratio of about 0.05 to about 1.9 moles of hydroxyl groups of (2) per mole of ester-exchangeable group of (1).

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**4,110,118**
## PROCESS FOR ACCELERATING THE DRYING OF OFFSET INKS

**Juan Salvat Dalmau, and Manuel Julián Lecha, both of Barcelona, Spain, assignors to Salvat Editores, S. A., Barcelona, Spain**

**Filed Jan. 31, 1977, Ser. No. 764,456**

**Claims priority, application Fed. Rep. of Germany, Oct. 8, 1976, 2645550**

**Int. Cl.[2] C09D** *11/14*

**U.S. Cl. 106—25** **7 Claims**

1. In the process for offset printing employing an offset printing ink, the improvement according to which the offset printing ink contains from 0.5 to 8 percent by weight of an additive composition comprising
(a) 15 to 85 percent functional amino polydimethylsiloxane, and
(b) 85 to 15 percent of a mixture of ethylene oxide and propylene oxide wherein the ethylene oxide is present in said mixture in an amount of from 15 to 85 percent with respect to the propylene oxide.

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**4,110,119**
## RELEASE AGENTS

**Günther Boehmke, Leverkusen; Hermann Fries, Bergisch-Gladbach, and Erich, Esch, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Filed Nov. 16, 1976, Ser. No. 742,201**

**Claims priority, application Fed. Rep. of Germany, Nov. 21, 1975, 2552283**

**Int. Cl.[2] B28B** *7/38*

**U.S. Cl. 106—38.24** **7 Claims**

1. A process for reducing the adhesion of molded articles of rubber compounds and plastics to the mold surfaces and for preventing sheet-form mixtures from sticking together which comprises applying to a mold surface a release agent consisting essentially of a compound having the formula

$$R—CO—NH—CH_2—CH_2—SO_3M$$

wherein R is alkyl or alkenyl of 7 to 21 carbon atoms and having up to two hydroxyl groups, and M is a member selected from the group consisting of alkali metal cation, alklaline earth metal cation, ammonium, mono-alkanolammonium, di-alkanolammonium, and tri-alkanolammonium, each said alkanol moiety being ethanol or propanol.

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**4,110,120**
## ANTICORROSION TREATMENT OF GALVANIZED REBARS

**Arnold Morry Rosenberg, Potomac, and James Michael Gaidis, Ellicott City, both of Md., assignors to W. R. Grace & Co., New York, N.Y.**

**Filed Jun. 28, 1976, Ser. No. 699,679**

**Int. Cl.[2] C04B** *7/02*

**U.S. Cl. 106—99** **2 Claims**

1. An article of manufacture comprising an alite cement matrix containing galvanized reinforcing bars treated by contacting the galvanized reinforcing bars with a composition consisting essentially of calcium chromate.

4,110,121

## PROCESS FOR PRODUCING CEMENT CLINKER

Helmuth Rechmeier, Balingen, and Gerhard Rohrbach, Dotternhausen, both of Fed. Rep. of Germany, assignors to Portlandzementwerk Dotternhausen Rudolf Rohbach Kommanditgesellschaft, Balingen, Fed. Rep. of Germany

Filed Jun. 8, 1977, Ser. No. 804,816

Claims priority, application Fed. Rep. of Germany, Jun. 16, 1976, 2627056

Int. Cl.² C04B 7/02

U.S. Cl. 106—100 18 Claims

1. In a process for producing cement clinker wherein raw meal is fed to a heat exchanger, heat is supplied to the heat exchanger from a downstream kiln, the raw meal is heated in the heat exchanger and the heated raw meal is conveyed to the kiln and sintered therein by use of a fuel to form the cement clinker, the improvement which comprises using high grade waste fuel formed from organic waste in the form of motor vehicle tires, rubber scrap, or plastics scrap and wherein the waste fuel is processed before combustion by pyrolysis to form pyrolysis gases and a pyrolyzed residue and said pyrolyzed residue is comminuted or gasified.

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4,110,122

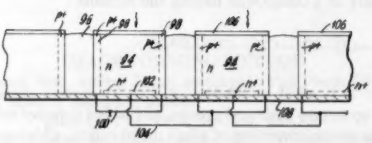
## HIGH-INTENSITY, SOLID-STATE-SOLAR CELL DEVICE

Roy Kaplow, Newton, and Robert I. Frank, Cambridge, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed May 26, 1976, Ser. No. 689,989

Int. Cl.² H01L 31/06

U.S. Cl. 136—89 P 22 Claims



1. A semiconductor solar cell device comprising plural, spaced, elongate, parallel semiconductor units formed from a common substrate and comprised of a first conductivity type, the body material of each of said units having the same spaced relation to the body material of other of said units as in the original substrate from which they are formed, each unit having spaced elongate upstanding sidewalls and having therebetween an elongate surface adapted for exposure to receive incident radiation, each unit further comprising separate and independent regions of second, opposite conductivity type in the respective side walls of each unit, whereby in each unit said sidewall regions of second conductivity type are separated by body material of said first conductivity type, separate conductive connections establishing ohmic contact between the second-conductivity-type regions of one unit and the first-conductivity-type region of another unit, and means fixedly retaining the material of said parallel units in the same spacial relation as in the common substrate from which they were formed.

4,110,123

## APPARATUS FOR CONVERTING LIGHT ENERGY INTO ELECTRICAL ENERGY

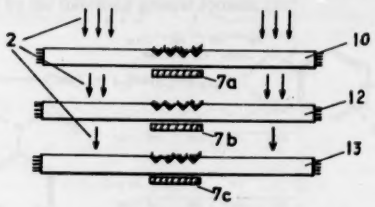
Adolf Goetzberger, Merzhausen, and Waldemar Greubel, Denzlingen, both of Fed. Rep. of Germany, assignors to Fraunhofer-Gesellschaft zur Forderung der angewandten Forschung e.V., Munich, Fed. Rep. of Germany

Filed May 4, 1977, Ser. No. 793,816

Claims priority, application Fed. Rep. of Germany, May 6, 1976, 2620115; Jun. 24, 1976, 2628291

Int. Cl.² H01L 31/04

U.S. Cl. 136—89 HY 20 Claims




1. An apparatus for converting solar energy into electrical energy, wherein light is collected in a light concentrator comprising a transparent layer, the refraction coefficient of which is greater than that of the ambient medium and which contains fluorescent centers and is fed to a solar cell, characterized in that more than one concentrator/solar cell combination is stacked on top of another through the intermediary of a medium having a smaller refraction coefficient than that of the concentrators, each concentrator being adapted to convert a portion of the incident spectrum into fluorescent light and supply it to a solar cell.

2. An apparatus according to claim 1, wherein the concentrators are so arranged that the concentrator upon which radiation strikes first absorbs the shortest wavelengths, the next to follow absorbs a somewhat longer wavelength range and the last absorbs the longest wavelength range.

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4,110,124

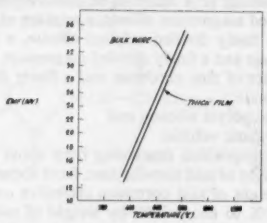
## THICK FILM THERMOCOUPLES

Allen R. Robertson, Edison, and James S. Hill, Cranford, both of N.J., assignors to Engelhard Minerals & Chemicals Corporation, Iselin, N.J.

Filed Sep. 22, 1975, Ser. No. 615,583

Int. Cl.² H01V 1/14; H01B 1/02

U.S. Cl. 136—236 R 20 Claims




1. A two-component system for use in forming by thick film techniques a thermocouple having joined positive and negative elements on a common electrically nonconductive surface, comprising:

a first paste and a second paste for application individually to said surface and firing thereon to form two films overlapping only at a thermoelectric junction area;

each of said pastes consisting essentially of (a) a powdered

metal component consisting of at least one metal selected from the group consisting of platinum, palladium, iridium, rhodium, ruthenium, gold, and silver, (b) a frit in amount by weight equal to between about 5-35 percent of the combined weight of metal and frit, said frit containing constituents neutral with respect to said metal components and a total of less than one weight percent of constituents capable of causing a significant detrimental effect on the thermoelectric EMF produced at said junction whereby the thermoelectric EMF of said thermocouple is stablized and drift of said EMF during operation is minimized, and (c) an organic liquid vehicle;

the composition of said powdered metal components in said first and second pastes being sufficiently different to provide said thermoelectric EMF across said junction; and

said powdered metal component and said frit being admixed and suspended in said vehicle in each of said pastes.

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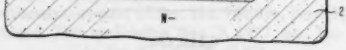
## 4,110,125
## METHOD FOR FABRICATING SEMICONDUCTOR DEVICES

**Klaus Dietrich Beyer, Poughkeepsie, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Mar. 3, 1977, Ser. No. 773,885**
**Int. Cl.² H01L** *21/95, 21/74, 21/76*
**U.S. Cl. 148—1.5** **22 Claims**




1. In the method of forming a planar, silicon semiconductor device which includes a first region of a first conductivity type, a second region of a second conductivity type formed in said first region and a third region of said first conductivity type formed within said second region, and wherein a composite silicon nitride-silicon dioxide layer is used as a mask during the formation of said third region,

the improvement, for reducing the number of pipes extending between said first and third regions, comprising:

forming said silicon dioxide layer on the surface of said semiconductor to a thickness of not more than around 3000A and not less than around 800A;

forming said silicon nitride layer atop said silicon oxide layer to a thickness of not more than around 600A and not less than a thickness of around 250A so as to provide effective masking properties;

forming a window in said composite layer to define said third region; and

forming said third region through said window.

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## 4,110,126
## NPN/PNP FABRICATION PROCESS WITH IMPROVED ALIGNMENT

**David Leo Bergeron, Manassas; Zimri Congdon Putney, Fairfax, and Geoffrey Brownell Stephens, Catlett, all of Va., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Aug. 31, 1977, Ser. No. 829,302**
**Int. Cl.² H01L** *21/265*
**U.S. Cl. 148—1.5** **6 Claims**

1. A process for forming a double diffused lateral PNP transistor in a semiconductor substrate of a first conductivity type having a buried diffusion of said first conductivity type, comprising the steps of:

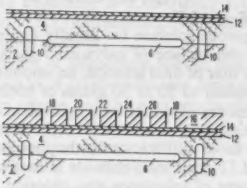
forming a silicon oxide passivation layer on the surface of said substrate;

forming a silicon nitride masking layer on the surface of said silicon oxide layer;

forming a first window for the emitter and base, a second window the collector contact, and a third window for the base contact by etching through said silicon nitride and silicon oxide layers above said buried region, employing a single masking step;

selectively covering said second window with a blocking layer and ion-implanting a base region of said first conductivity type through said first window and a base contact of said first conductivity type through said third window, to contact said buried region;

reforming an oxide layer in said first, second and third windows;




selectively covering said third window with a blocking layer having an opening over said first and second windows and ion-implanting a collector region of a second conductivity type opposite to said first conductivity type in the substrate beneath said opening in said second blocking layer;

selectively covering with a third blocking layer said third window and forming an emitter region of said second conductivity type through said first window within said base region, and a collector contact of said second conductivity type through said second window, in said collector region;

whereby a minimum size double diffused lateral PNP device is formed with a minimum number of hot processing steps.

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## 4,110,127
## PROCEDURE FOR DEPOSITING A PROTECTIVE PRECOATING ON SURFACES OF ZINC-COATED FERROUS METAL PARTS AGAINST CORROSION IN PRESENCE OF WATER

**Michel Longuepee, Cantin, and Noël Dreulle, Auby-lez-Douai, both of France, assignors to International Lead Zinc Research Organization, Inc., New York, N.Y.**

**Division of Ser. No. 541,513, Jan. 16, 1975, abandoned. This application Jun. 21, 1976, Ser. No. 697,761**
**Claims priority, application France, Jan. 23, 1974, 74 02178**
**Int. Cl.² C23F** *7/08*
**U.S. Cl. 148—6.15 Z** **20 Claims**

1. A process for depositing a protective coating on the surface of an article having a zinc surface, comprising contacting with said surface an aqueous solution containing, per liter of solution, metasilicate equivalent to 1 to 40 grams of sodium metasilicate, phosphate equivalent to 14 to 40 milliliters of phosphoric acid having a density of 1.71 g/ml, nitrate equivalent to 1 to 40 grams of sodium nitrate, and zinc equivalent to 10 to 50 grams of anhydrous zinc chloride, said solution having a pH between 2.3 and 3.8, and a temperature between 15° and 75° C., for between 20 and 72 hours at the aforesaid temperature, and rinsing said surface with water.

4,110,128

## SOLUTION AND PROCEDURE FOR DEPOSITING A PROTECTIVE COATING ON GALVANIZED STEEL PARTS, AND SOLUTION REGENERATION PROCEDURE

Paule Dreulle, Douai; Michel Longuépée, Cantin, and Dominique Dhaussy, Auby Lez Douai, all of France, assignors to International Lead Zinc Research Organization, Inc., New York, N.Y.

Continuation of Ser. No. 681,545, Apr. 29, 1976, abandoned. This application Jan. 12, 1977, Ser. No. 758,868
Claims priority, application Canada, Dec. 17, 1975, 241973
Int. Cl.[2] C23F 7/08
U.S. Cl. 148—6.15 Z 50 Claims

1. An aqueous solution for rapidly depositing a protective coating on the surface of galvanized parts, consisting essentially of per liter of final solution, an amount of hexametaphosphate equivalent to 10 to 70 grams of sodium hexametaphosphate, an amount of metasilicate equivalent to 1 to 40 grams of sodium metasilicate, an amount of orthophosphoric acid equivalent to 15 to 40 milliliters of orthophosphoric acid having a density of 1.71 g/ml, zinc chloride in an amount equivalent to 10 to 50 grams of anhydrous zinc chloride, and sufficient calcium carbonate to adjust the pH of said solution to a value between 2.0 and 3.0.

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4,110,129

## POST TREATMENT OF CONVERSION-COATED ZINC SURFACES

Yasunobu Matsushima, Kawasaki; Kuniji Yashiro, Yokohama; Hideaki Kaneko, and Masanori Suzuki, both of Tokyo, all of Japan, assignors to Oxy Metal Industries Corporation, Warren, Mich.

Filed Feb. 3, 1977, Ser. No. 765,335
Int. Cl.[2] C23F 7/12
U.S. Cl. 148—6.15 R 7 Claims

1. A chromium-free process for treating an oxide or phosphate conversion coated zinc or zinc alloy surface comprising contacting the surface with an aqueous post-treatment solution comprising at least 0.02 g/l of titanium ion and at least 0.1 g/l of at least one adjuvant selected from the group consisting of phosphoric acid, phytic acid, tannin, the salts or esters of the foregoing and hydrogen peroxide.

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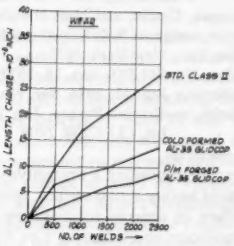
4,110,130

## FORGING POWDERED DISPERSION STRENGTHENED METAL

Anil Vasant Nadkarni, Pasadena, Md., assignor to SCM Corporation, New York, N.Y.

Filed Sep. 29, 1976, Ser. No. 727,890
Int. Cl.[2] B22F 3/12
U.S. Cl. 148—11.5 P 1 Claim




1. A two-step process for producing a dispersion strengthened metal product having substantially an isotropic grain structure and produced from dispersion strengthened metal powder having an average particle size less than about 300 microns, the process comprising:

cold forming from said metal powder a preform having a density of between 80% to 90% of the theoretical full density of said product;

coating the preform with graphite lubricant and hot forging said preform at temperatures above about 1400° F. to form substantially a full density product having a density of at least 98% of the theoretical density, said product having substantially an isotropic grain structure.

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4,110,131

## METHOD FOR POWDER-METALLURGIC PRODUCTION OF A WORKPIECE FROM A HIGH TEMPERATURE ALLOY

Gernot Gessinger, Bublikon, Switzerland, assignor to BBC Brown Boveri & Company, Limited, Baden, Switzerland

Filed Oct. 15, 1976, Ser. No. 732,753
Claims priority, application Switzerland, Oct. 20, 1975, 13558/75
Int. Cl.[2] C22F 1/10
U.S. Cl. 148—11.5 N 9 Claims

1. A method for powder metallurgical production of a high temperature alloy body which consists of mixing powdered alloy components or pre-alloys in the desired proportions; cold working the mix under a protective atmosphere; canning the cold-worked powder mixture; compressing the canned powder by extrusion or hot isostatic pressing to form a dense blank; cutting said blank into slices; forging them at a constant temperature within the range of from 700-800° C. at a strain rate of from $10^{-3}$ to $10^{-2}$ $S^{-1}$; and thereafter subjecting the forged body to a coarse-grain annealing between 1230° and 1300° C. for up to 3 hours.

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4,110,132

## IMPROVED COPPER BASE ALLOYS

Prakash D. Parikh, and Eugene Shapiro, both of Hamden, Conn., assignors to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 727,728, Sep. 29, 1976, Pat. No. 4,047,978, which is a continuation of Ser. No. 568,870, Apr. 17, 1975, abandoned. This application Jul. 5, 1977, Ser. No. 812,879
Int. Cl.[2] C22C 9/01; C22F 1/08
U.S. Cl. 148—32 6 Claims

1. An annealed copper base alloy having a high bend ductility, said alloy having a stacking fault energy of less than 30 ergs per square centimeter, said alloy consisting essentially of a first element selected from the group consisting of about 2 to 12% aluminum, about 2 to 6% germanium, about 2 to 10% gallium, about 3 to 12% indium, about 1 to 5% silicon, about 4 to 12% tin, about 8 to 37% zinc, balance essentially copper, said alloy having a non-random texture with a plastic strain ratio measured 90° to the rolling direction of less than about 0.75, wherein the grain structure is either unrecrystallized or partially recrystallized.

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4,110,133

## GROWTH OF SEMICONDUCTOR COMPOUNDS BY LIQUID PHASE EPITAXY

Ian Garrett, Watford, and Michael Rivers Taylor, London, both of England, assignors to The Post Office, London, England

Filed Apr. 21, 1977, Ser. No. 789,714
Claims priority, application United Kingdom, Apr. 29, 1976, 17512/76; Sep. 2, 1976, 36428/76
Int. Cl.[2] H01L 21/208
U.S. Cl. 148—171 5 Claims

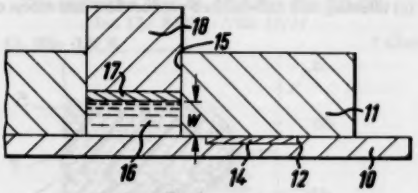
1. A method of growing a semiconductor compound by liquid phase epitaxy which comprises:

(a) providing a suitable solvent and providing a source of a compound to be grown in contact with the upper surface of the solvent;

(b) heating the solvent and the source of the compound to a predetermined first temperature and allowing the solute to form a solution and to come to equilibrium with the solvent;

(c) subjecting the solution formed in (b) to a rapid relatively small decrease in temperature to a second temperature to produce a supersaturated solution;

(d) keeping the source of the compound in contact with the thus-supersaturated solution and maintaining the temperature substantially constant for a predetermined first period of time at the second temperature; and




(e) bringing the solution with the source in contact with the upper surface thereof into contact with a substrate on which the compound is to be grown for a predetermined second period of time at the second temperature.

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**4,110,134**

**WATER-IN-OIL EMULSION EXPLOSIVE COMPOSITION**

**Charles G. Wade, Lehighton, Pa., assignor to Atlas Powder Company, Tamaqua, Pa.**

**Continuation-in-part of Ser. No. 740,094, Nov. 9, 1976, abandoned. This application Nov. 3, 1977, Ser. No. 848,333**

**Int. Cl.² G06B *45/00***

**U.S. Cl. 149—2** **41 Claims**

1. A water-in-oil explosive composition that is detonable by a No. 6 cap in cartridge diameters of about 1.25 inches and less consisting of:

(a) a continuous phase of a carbonaceous fuel;

(b) a discontinuous aqueous phase containing an inorganic oxidizer composed principally of ammonium nitrate;

(c) from about 0.5% to about 2% by weight of the composition of an emulsifier selected from the group consisting of sorbitan fatty esters, glycerides of fat-forming fatty acids, polyoxyethylene sorbitol esters, polyoxyethylene ethers, polyoxyalkylene oleate, polyoxyalkylene laurate, oleyl acid phosphate, substituted oxazolines and phosphate esters thereof;

(d) up to about 15% by weight thereof of an auxiliary fuel; and

(e) sufficient closed cell void containing material to yield a density of said explosive composition in the range of from about 0.90 g/cc to about 1.35 g/cc.

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**4,110,135**

**CONTROL OF CURE RATE OF POLYURETHANE RESIN BASED PROPELLANTS**

**William Hardin Graham, and Inella Gatlin Shepard, both of Huntsville, Ala., assignors to Thiokol Corporation, Newtown, Pa.**

**Filed Nov. 11, 1976, Ser. No. 740,994**

**Int. Cl.² C06B *45/10***

**U.S. Cl. 149—19.4** **2 Claims**

1. A process for the control of the pot life and curing rate of a hydroxy terminated polybutadiene based polyurethane bound propellant grain which comprises, admixing with a propellant grain containing an uncured binder based upon a hydroxy terminated polybutadiene and a polyisocyanate, a catalyst, said catalyst comprising a metallo organic compound and either a carboxylic acid or a compound convertible to a carboxylic acid by reaction with Zerewitinoff active hydrogen.

**4,110,136**

**EXPLOSIVES CONTAINING AMMONIUM NITRATE AND NITRATED AMINES**

**Joseph Hershkowitz, West Caldwell, N.J., and Irving B. Akst, Pampa, Tex., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Feb. 17, 1977, Ser. No. 769,607**

**Int. Cl.² C06B *31/32***

**U.S. Cl. 149—47** **8 Claims**

1. An explosive composition consisting essentially of a mixture of

15 to 45% by weight of a particulate high explosive selected from the group consisting of 1,3,5-trinitro-1,3,5-triazacyclohexane and 1,3,5,7-tetranitro-1,3,5,7-tetraazacyclooctane, and mixtures thereof;

15 to 50% by weight of ammonium nitrate; and

20 to 60% by weight of ethylenediamine dinitrate; wherein the ammonium nitrate and the ethylenediamine dinitrate are present in the weight ratio of from 1:2.5 to 1.5:1, respectively, as an intimate mixture of which the major portion is obtained by cosolidification.

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**4,110,137**

**COMPOSITION FOR FILLING CABLES**

**Shirley Beach, North Vancouver, Canada, assignor to Phillips Cable Limited, Brockville, Canada**

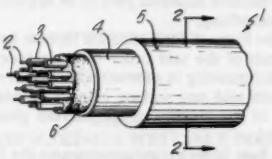
**Continuation-in-part of Ser. No. 428,757, Dec. 27, 1973, Pat. No. 3,961,128. This application Apr. 14, 1976, Ser. No. 676,991**

**Claims priority, application Canada, Dec. 29, 1972, 160290**

**The portion of the term of this patent subsequent to Jun. 1, 1993, has been disclaimed.**

**Int. Cl.² H02G *15/20***

**U.S. Cl. 156—48** **14 Claims**




1. In a method of making a communication cable the improvement comprising:

a. providing a plurality of conductors surrounded by a sheath, and

b. filling the interstices between individual conductors and between the conductors and the sheath with a composition comprising petroleum jelly and siliceous material in an amount effective to render the petroleum jelly viscous at elevated temperatures, the siliceous material being substantially uniformly distributed throughout the petroleum jelly.

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**4,110,138**

**HAND CRAFT YARN ART MATERIALS AND STRUCTURE AND METHODS OF MANUFACTURE AND USE THEREOF**

**Junichi Nomura, 10-4 Mitsuya-cho, Nagahama, and Masashi Kanai, 1854-23, Ooka-machi, Yokohama, both of Japan**

**Filed Mar. 17, 1977, Ser. No. 778,676**

**Int. Cl.² B32B *5/08***

**U.S. Cl. 156—63** **21 Claims**

1. A backing material for handcraft yarn acts comprising:

a foundation fabric having a regular woven pattern of a first thread material including warps and woofs and having interwoven therewith a warp of thermo plastic pile threads interlocked by the warps and woofs, said thermo

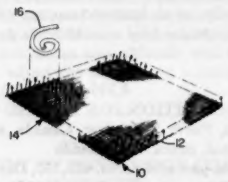
plastic pile warps being initially formed as elongated pile loops,

said pile loops being cut in the upper arcuate portions thereof to form individual pile threads extending from said surface of said foundation fabric in substantially upright relation and having free ends, adjacent such individual threads having a common central portion remaining interlocked in the foundation fabric by the warps and woofs of said first material thereof,

said individual pile threads being of a height relative to said foundation fabric corresponding to the same order of magnitude of the thickest diameter yarn to be applied to the backing material, and

the free ends of said thermo plastic threads being deformed by application of heat thereto in an irregular random pattern to form an irregular random pattern of enlarged deformations on the ends thereof.

13. A method of manufacture of a backing material for




handcraft yarn arts from a foundation fabric having plural thermo plastic pile loops anchored within the foundation fabric and extending from one surface thereof in substantially upright relation with respect thereto, the loops having respective arcuate portions displaced from said one surface of the foundation fabric at substantially equal height of the order of magnitude of the thickest diameter yarn to be applied to the backing material, comprising:

cutting the loops to form separate threads having individual free ends of the said order of magnitude in height, the threads remaining in substantially upright relation extending from said one surface of said foundation fabric by virtue of the rigidity of the thermo plastic pile thread material,

applying heat in an irregular pattern to the free ends of the said upright threads of the material to produce an irregular, random pattern of enlarged ends of said threads resulting from deformation of the thread material due to the heat.

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**4,110,139**

## PROCESS FOR PREPARING BANDS OR BELTS, PARTICULARLY SUITABLE FOR USE AS WATCH BANDS

**Toru Mashida; Sumeo Matsushita, both of Tokyo, and Iwao Ikegami, Ichikawa, all of Japan, assignors to NCO Works Ltd., Tokyo, Japan**

**Filed Mar. 13, 1975, Ser. No. 558,085**

**Claims priority, application Japan, Mar. 13, 1974, 49-29456; Apr. 22, 1974, 49-45676; Apr. 23, 1974, 49-46296**

**Int. Cl.[2] B29D** *27/00;* **B32B** *5/18, 5/24, 5/30*

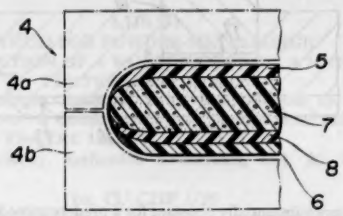
**U.S. Cl. 156—79** **26 Claims**

1. A process for preparing bands of belts, particularly those suitable for use as watch bands comprising steps of:

(a) manufacturing a substantially air tight press mold comprising at least two parts adapted to form a recess between said two parts and bearing complementary patterns of a prototype on at least one surface of said recess by setting liquid silicone rubber of slowly setting type poured onto the prototype,

(b) preparing a half-finished product of a laminated sheet and sealing the periphery of said laminated sheet by a high frequency dielectric heating means, said laminated sheet comprising at least one layer of an expandable thermoplastic material with a foaming agent having a large dielectric loss and at least one surface layer of a material substantially capable of being embossed by said press mold into a pattern similar to said prototype pattern in the recess, a peripheral contour of said laminated sheet being substantially similar to the inner peripheral contour of said recess,

(c) inserting said half-finished product into said recess of the




press mold and maintaining the press mold air tight under pressure, and

(d) heating said half-finished product in said press mold in a high frequency dielectric device to permit said expandable thermoplastic material to expand by foaming so that the resulting inner pressure pressed the top back surface layers of the half-finished product against the inner surface of said recess to emboss at least the one surface layer.

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**4,110,140**

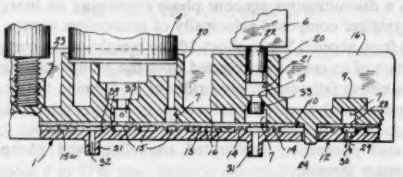
## METHOD OF MAKING FLUID SYSTEM CIRCUIT BOARD

**Richard N. Laakaniemi; Leon C. Ploszaj, and Bruce R. Schultz, all of Milwaukee, Wis., assignors to Johnson Controls, Inc., Milwaukee, Wis.**

**Filed Dec. 15, 1976, Ser. No. 750,650**

**Int. Cl.[2] B32B** *31/04*

**U.S. Cl. 156—87** **22 Claims**

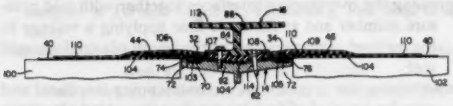


1. The method of forming a multiple member circuit board unit for a fluid system comprising forming first and second board members located in stacked relation and said board members having opposed surfaces, said first member having a recess in the opposed surface and said second member forming a closure for said recess in said first member, providing spacing means interposed between the opposed surfaces of the first member having the recess and the second member, said spacing means defining separating walls extending generally parallel to the recess, locating a sheet like adhesive member adjacent said surface having said recess of the first member with said spacing means engaging the opposite side of the adhesive member from the first member and engaging the surface of the closure member to form a circuit board assembly, said spacing means defining chambers aligned with the recesses and located on the opposite side of the adhesive member, said board members and adhesive member being formed of bondably compatible materials, and activating said adhesive member to intimately bond the adhesive member to the adjacent surfaces and thereby cover said recess to form fluid tight passageways with said chambers forming a space into which gaseous medium generated in the activating of the adhesive member move to prevent disruption of the adhesive.

## 4,110,141
## METHOD OF MAKING AN INTEGRALLY BUILT AND CURED CLOSED TORUS TIRE AND WHEEL ASSEMBLY

Vito A. Caravito, Uniontown, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 633,534, Nov. 19, 1975, Pat. No. 4,085,786. This application Mar. 11, 1977, Ser. No. 777,239
Int. Cl.[2] B29H *17/02, 17/14*
U.S. Cl. 156—123 R 2 Claims



1. A method of manufacturing an integral pneumatic tire and rim assembly wherein said rim is of an annular unitary type construction comprising wrapping at least one carcass ply circumferentially about said rim with the axially outer ends extending axially outwardly beyond the axially outer edges of said rim, helically winding at least one inextensible member about said rim to form an annular bead core about said carcass ply to said rim, providing a circumferentially extending rigid clamping means about the radially outer wall of said carcass ply adjacent the central portion of the area engaging said rim and drawing said rigid means tightly against said carcass ply to clamp said carcass ply to said rim, folding the axially outer ends of said ply axially across said rim to form a circumferentially extending splice, providing a circumferentially extending tread structure about said ply and placing said tire and rim assembly in a curing apparatus including a mold and curing said tire.

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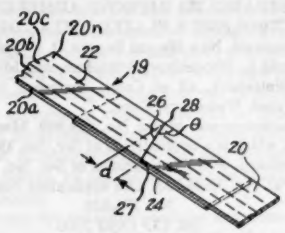
## 4,110,142
## METHOD OF SPLICING MULTITRACK SOUND RECORDING TAPE

Joel Tall, Washington, D.C., assignor to Joel Tall, Inc., Mount Vernon, N.Y.

Continuation-in-part of Ser. No. 737,101, Oct. 29, 1976, abandoned. This application Oct. 17, 1977, Ser. No. 842,875
Int. Cl.[2] G11B *27/06*
U.S. Cl. 156—159 1 Claim




1. A method of splicing magnetic sound recording tape with a splicing block in order to edit the tape by joining two pieces of the tape, wherein the tape is multitrack tape having two or more synchronized audio frequency tracks extending there along, comprising the steps of:

(a) using a standard editing speed of fifteen inches per second for recording and playing the multitrack tape;

(b) selecting a portion of the multitrack tape having wide-band noise;

(c) selecting a splicing block with a groove therein having a width approximately the width of the multitrack tape and a straight slit which intersects and traverses the groove at an angle $\theta$ therewith, wherein the angle $\theta$ is selected so that the distance between the leading point of cut at one edge of the multitrack tape and the lagging point of cut at the other edge of the multitrack tape is approximately 0.150 inch regardless of the width of the multitrack tape and the number of synchronized tracks on the tape;

(d) placing the pieces of multitrack tape in the groove, one at a time, with the selected portion of the tape having wide-band noise aligned with the slit;

(e) cutting the pieces of multitrack tape by passing an instrument with a straight sharp blade through the slit and through the wide band noise portion of the multitrack tape, across all tracks of the tape, wherein by virture of the blade following the slit, the distance between the leading point of cut at one edge of the tape and the lagging point of cut at the other edge of the tape is approximately 0.150 inch regardless of the width of the tape and the number of synchronized tracks on the tape;

(f) aligning the edges of the cuts of the pieces to be spliced so as to align the tracks with one another;

(g) joining the two pieces of tape cut in accordance with step e) by adhering a length of splice tape in overlapping relationship with the two pieces so that when the multitrack tape is played at a speed of fifteen inches per second, the time segment between the leading and lagging points of cut will be approximately 0.01 second regardless of the width of the tape and number of synchronized tracks on the tape.

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## 4,110,143
## PROCESS FOR MAKING A WETTABLE POLYOLEFIN BATTERY SEPARATOR

Joseph A. Cogliano, Baltimore, and Nelson S. Marans, Silver Springs, both of Md., assignors to W. R. Grace & Co., New York, N.Y.

Filed Oct. 21, 1974, Ser. No. 516,224
Int. Cl.[2] H01M *2/16*
U.S. Cl. 156—167 4 Claims

1. The process of forming a wettable battery separator from a polyolefin which comprises extruding a heated polyolefin through multiple die openings into a gas stream which attenuates the polyolefin into fibers having an average diameter between 1 to about 10 microns, collecting said fibers as a self-supporting mat on a collecting device, compacting the thus formed mat to a thickness between 10 and 40 mils and pore sizes less than 40 microns, contacting the mat with an aqueous solution of a water-soluble, peroxy compound at a temperature below 70° C. without the introduction of oxygen, rinsing the thus contacted mat in a water bath and thereafter at a temperature below 70° C. immersing the thus rinsed mat in an aqueous solution of a hydrophilic vinyl monomer of the formula

$$R-\underset{\displaystyle R_1}{\overset{|}{C}}=CH_2$$

wherein at least one of R and $R_1$ are hydrophilic radicals, said solution containing a redox catalyst, thereby causing a graft polymerization of said hydrophilic vinyl monomer onto said polyolefin mat to form a wettable polyolefin battery separator.

**4,110,144**

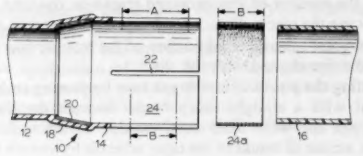
## MECHANICALLY LOCKED BELL AND SPIGOT COUPLING FOR DUCTS AND METHOD OF FORMING

**Amsey Buehler, and Kirk Thomas Butcher, both of Cobourg, Canada, assignors to Canadian General Electric Company Limited, Toronto, Canada**

**Division of Ser. No. 389,780, Aug. 20, 1973, abandoned. This application Mar. 28, 1977, Ser. No. 781,919**

**Int. Cl.[2] B65H *81/00*; F16L *37/08***

**U.S. Cl. 156—173** **6 Claims**




1. The method of manufacturing a plastic duct having a bell coupling formation integral therewith comprising the steps of:

(a) providing a mandrel having a duct forming section; a bell forming section; and a neck section interconnecting said duct and bell forming sections;

(b) locating an elastomeric sealing means around said neck section;

(c) providing abrasive means around at least a portion of said bell forming section;

(d) winding glass fiber roving coated with uncured epoxy resin around said mandrel sections to form a predetermined wall thickness;

(e) curing the epoxy resin,

(f) removing the duct and bell coupling formation with the integral elastomer sealing means and abrasive means, and

(g) forming at least one axially aligned slot in the wall of the bell coupling formation.

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**4,110,145**

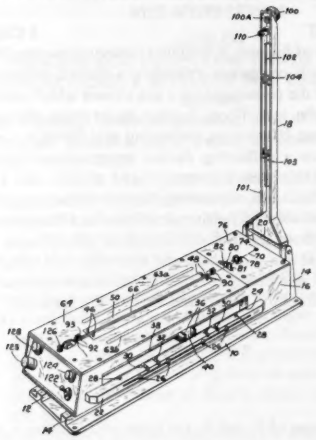
## METHOD FOR SEALING PLASTIC FILMS AND THE LIKE

**Anthony Joseph Lombardi, Flanders, N.J., assignor to Barney Knitting Machinery Co., Inc., Brooklyn, N.Y.**

**Division of Ser. No. 698,189, Jun. 21, 1976, Pat. No. 4,045,272. This application Jun. 16, 1977, Ser. No. 807,012**

**Int. Cl.[2] B29D *23/10*; B29C *19/06***

**U.S. Cl. 156—218** **10 Claims**



1. A method of forming a tubular pattern control card using a sealing apparatus having a tubular housing containing a reel of wire and a pressure member mounted to selectively exert pressure along one surface of said housing, the method comprising:

preparing a length of flexible plastic film with a predetermined array of punched holes;

fixing one end of said length of film on the one surface of the sealing apparatus;

withdrawing a length of wire from said reel and positioning and retaining it along said fixed one end of film in conducting means on said surface;

looping and fixing the other end of said film to sandwich the retained wire between the overlapping interfaces of the film ends;

pressing the overlapping interfaces together with said pressure member and at the same time applying a voltage to the retained wire and severing the length of wire from said reel;

maintaining the pressure on the overlapping interfaces and wire for a period of time longer than the period of voltage application, whereby the interfacing surfaces of the film adhere along the length of wire; and

releasing the pressure member and removing the formed tubular pattern control card from the sealing apparatus.

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**4,110,146**

## METHOD OF PRODUCING A PACKING BLANK

**Niels Bro, Ballerup, Denmark, assignor to Bantex A/S, Allerod, Denmark**

**Filed Aug. 3, 1977, Ser. No. 821,578**

**Int. Cl.[2] B32B *7/10***

**U.S. Cl. 156—291** **2 Claims**

1. A method of producing a packing blank consisting of a rigid plate material, e.g. cardboard, and a cover of foil material enclosing the plate material, said cover consisting of two pieces of foil peripherally larger than the plate material, each being glued to its respective large surface of the plate material and subsequently welded together along the edge areas protruding beyond the plate material, said method comprising the steps of extruding an adhesive onto a first foil material over an area corresponding to the large surface of the plate material, positioning the large outer surface of the plate material onto that area of said first foil carrying the adhesive, extruding an adhesive onto the other large, free outer surface of the plate material, and placing a second foil material on said free outer surface, leaving the edges free from adhesive and thereafter welding the edge areas of both foils together to enclose said plate material.

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**4,110,147**

## PROCESS OF PREPARING THERMOSET RESIN SUBSTRATES TO IMPROVE ADHERENCE OF ELECTROLESSLY PLATED METAL DEPOSITS

**John J. Grunwald, New Haven; Eugene D. D'Ottavio, Thomaston; Harold L. Rhodenizer, Bethlehem, and Michael S. Lombardo, Waterbury, all of Conn., assignors to MacDermid Incorporated, Waterbury, Conn.**

**Continuation-in-part of Ser. No. 669,909, Mar. 24, 1976, abandoned, which is a continuation of Ser. No. 197,165, Nov. 9, 1971, abandoned, which is a division of Ser. No. 889,472, Dec. 31, 1969, Pat. No. 3,620,933. This application Jan. 3, 1977, Ser. No. 756,428**

**Int. Cl.[2] C09J *5/00***

**U.S. Cl. 156—306** **5 Claims**

1. In a process of preparing an intermediate article of commerce comprising a laminate of aluminum foil and a thermoset resin substrate, which article is particularly adapted for use in producing printed circuit boards by additive electroless plating techniques after the aluminum foil has been chemically stripped from said resin substrate, the steps which comprise

anodizing said aluminum foil in a phosphoric electrolyte to

develop an aluminum oxide film on the surface of the foil which is to confront the surface of the substrate in said article;

placing said aluminum foil with its anodized surface confronting the surface of a substrate comprising a plurality of glass fiber reinforced, B-stage epoxy resin prepregs; and

applying sufficient heat and pressure to complete the cure of said substrate and bond said foil thereto to produce said laminate.

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**4,110,148**

## APPARATUS FOR RAPIDLY PRODUCING CEMENTED PANES OF INSULATING GLASS

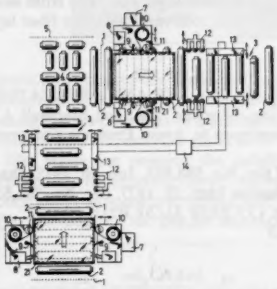
**Martin-Gottfried Rocholl, Heidelberg, Fed. Rep. of Germany, assignor to Teroson G.m.b.H., Heidelberg, Fed. Rep. of Germany**

**Division of Ser. No. 508,637, Sep. 23, 1974. This application Aug. 18, 1977, Ser. No. 825,620**

**Claims priority, application Fed. Rep. of Germany, Oct. 18, 1973, 2352294**

**Int. Cl.² C03C *27/10***

**U.S. Cl. 156—359** **4 Claims**



1. An apparatus for producing sealed panes of insulating glass employing capacitive high frequency heating to cure the sealant, said apparatus comprising;

(a) a plurality of rollers for supporting and conveying at least two horizontally positioned superposed panes of glass, said panes having first and second pairs of opposed lateral edges and being separated by a spacer located near but back fron said lateral edges and creating therewith an open continuous channel defined by said lateral edges and said spacer for receiving sealant;

(b) a first means for applying sealant into the portions of said channel defined by said first pair of opposed lateral edges;

(c) two first pairs of separated electrodes, said pairs being spaced from one another and connected to a high frequency generator and adapted to impart heat capacitively to said sealant, one each of said pairs of electrodes being located generally adjacent a pair of opposed lateral edges of said panes making up said first pair of such edges and laterally movable in relation thereto in order that the separated electrodes of each of said pairs are positionable such that substantially only the said sealant receiving channel defined by said lateral edges is located between the electrodes;

(d) first means for optically scanning and determining the distance between said first pair of lateral edges defining said sealant-receiving portions of said channel and positioning the said first pair of electrodes in accordance with said determined distance such that substantially only the sealant receiving portions of said channel defined by said first pair of lateral edges is located between said electrodes;

(e) a second means for applying sealant into the portions of said channel defined by said second pair of lateral edges of said panes and said separator;

(f) two second pairs of separated electrodes, said second pairs also being spaced from another and connected to a high frequency gnerator and adapted to impart heat capacitively to said sealant, one each of said second pairs being located generally adjacent a pair of opposed lateral edges of said panes making up said second such pair and laterally movable in relation thereto in order that the separated electrodes of each of said second pairs is positionable such that substantially only the said sealant receiving channel defined by said second pair of lateral edges is located between the electrodes of said second pairs; and

(g) second means for optically scanning and determining the distance between said second pair of lateral edges defining said sealant receiving channel portions and positioning the said second pair of electrodes in accordance with said determined distance such that substantially only the said sealant receiving channel portions defined by said second pair of lateral edges is located between the electrodes of said two second pairs of electrodes.

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**4,110,149**

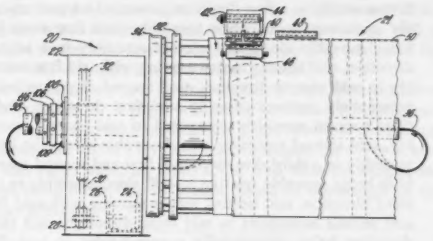
## ROTATABLY DRIVEN MANDREL HAVING OUTER WALL FORMED BY CONTINUOUSLY CIRCULATING ENDLESS HELICAL BAND AND RADIALLY ADJUSTABLE SUPPORT MEMBERS FOR THE BAND

**Peder Ulrik Poulsen, Fredensborg, Denmark, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Filed Jul. 7, 1977, Ser. No. 813,579**

**Int. Cl.² B65H *81/00***

**U.S. Cl. 156—429** **10 Claims**



1. A rotatably driveable mandrel for continuous production of pipe, the mandrel comprising a horizontally extending tubular shaft forming a central structural support member of the mandrel, means rotatably mounting an end portion of the tubular shaft, means for rotatably driving the tubular shaft, an outer mandrel wall spaced from and surrounding a free end portion of the tubular shaft, the outer wall being formed of an endless helical band which continuously circulates as the mandrel is rotatably driven, the band being wound helically toward the free end portion of the tubular shaft with a pitch corresponding to the band width whereby the convolutions are disposed in edge-to-edge relationship and being returned through the tubular shaft from the free end portion toward the mounted end portion thereof and back to the point where the winding starts, a plurality of elongated support members for the helical windings of the band, the band support members being circularly disposed and spaced equally apart about the tubular shaft, each band support member being supported by a plurality of parallel pivotable arms of equal length spaced from each other axially of the tubular shaft and having outer end portions pivotally connected to the band support member and inner end portions pivotally connected to the tubular shaft, means for preventing movement of the band support members axially of the tubular shaft while accommodating movement thereof radially of the tubular shaft, and shaft adjusting means

for moving the tubular shaft axially in its mounting means to move the band support members radially.

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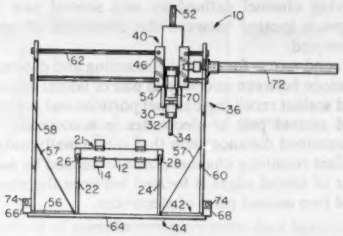
**4,110,150**

## APPARATUS FOR JOINING FUSIBLE ELEMENTS

**Richard C. Ostrowski, and John Styfhoorn, both of Dunlap, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Filed May 25, 1977, Ser. No. 800,507**
**Int. Cl.[2] B32B *31/00***
**U.S. Cl. 156—499** **4 Claims**




1. Apparatus for joining a first fusable element defining a preselected pathway and a second fusable element along the pathway, comprising:

first means for supporting the first fusable element;

means for controllably heating selected portions of said first element about the pathway to a temperature sufficient for forming a bond with said second element;

second means for supporting the heating means, said second support means including a first support assembly, said heating means being connected to and movable along said first assembly in a first direction; a second support assembly connected to said first assembly, said first assembly being movable along said second assembly in a second direction, said heating means moving with said first assembly in said second direction, said second direction being substantialy perpendicular to said first direction; and a third support assembly connected to said second assembly, said second assembly being movable along the third assembly in a third direction, said first and second assemblies being movable relative to said third assembly in the third direction, said heating means moving with said first and second assemblies in said third direction, said third direction being substantially perpendicular to said first and second directions;

first motor means for moving the heating means along the first assembly in the first direction;

second motor means for moving the first assembly and the heating means therewith in the second direction; and

third motor means for moving the second assembly and the first assembly and heating means therewith in the third direction.

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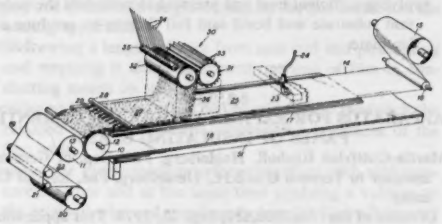
**4,110,151**

## APPARATUS FOR THE PREPARATION OF RESIN IMPREGNATED GLASS FIBER SHEETS

**Donald B. Morse, Joliet, Ill., assignor to Kemlite Corporation, Joliet, Ill.**

**Division of Ser. No. 259,846, Jun. 5, 1972, Pat. No. 3,888,716.**
**This application Dec. 12, 1974, Ser. No. 532,206**
**Int. Cl.[2] B32B *31/12***
**U.S. Cl. 156—519** **5 Claims**

1. Apparatus for preparing a resin impregnated glass fiber sheet comprising a pair of spaced rolls, having a nip therebetween, a cover film extending over one of said rolls and into the nip of said rolls, a second cover film extending over the other of said rolls and into the nip of said rolls, one of said films having thereon a layer of thermosetting resin, means for depositing resin on said one film, said means including a pump, and power means for driving said pump and said rolls at synchronized speeds whereby said pump is caused to deliver sufficient resins to fill the nip between said films and to form a pool therebetween above the nip of said rolls so as to maintain said pool as the operation proceeds, means for cutting glass fiber strands into individual fibers and for distributing the cut fibers



at a location above said resin layer to cause the cut fibers to fall and form a layer of glass fibers on said resin layer, said films forming between said rolls a pocket, and a pool of resin in said pocket whereby upon rotation of said rolls toward each other said pool is fed by said resin layer and resin from said pool is pressed in the nip of said rolls into said glass fiber layer.

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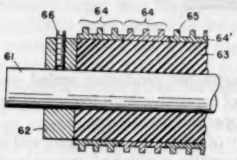
**4,110,152**

## EMBOSSING ROLLER AND APPARATUS

**Richard E. Dunning, Munster, Ind., and Marshall A. Nelson, Lansing, Ill., assignors to Avery Products Corporation, San Marino, Calif.**

**Continuation of Ser. No. 588,853, Jun. 20, 1975, abandoned.**
**This application Mar. 25, 1977, Ser. No. 781,529**
**Int. Cl.[2] B32B *31/20*; B21B *27/02***
**U.S. Cl. 156—553** **17 Claims**




1. Apparatus for embossing and coating a plastically deformable surface comprising:

a web of film carrying a thermally transferable coating;

means for disposing over the plastically deformable surface a portion of the web;

means for heating the surface, film, and coating;

an embossing roller comprising resiliently supported, separate, independently movable rings disposed adjacent one another across the width of the roller, the rings extending concentrically around the roller and being resiliently movable radially relative to the rotational axis of the roller; and

a plurality of discrete mutually spaced apart rigid lands protruding radially from each ring around the circumference of the ring for being resiliently movable with corresponding movement of the ring;

means for urging the roller against the film and surface with the axis of the roller extending across the width of the film and surface; and

means for rolling the roller over the film and the surface to thereby roll the film and coating against the surface while the roller is so urged to emboss a plurality of discrete spaced apart three-dimensional indentations across the width of the film and the surface;

the lands on each ring being resiliently movable indepen-

dently of lands on a separate ring as well as lands on each ring being resiliently movable in response to irregularities in the surface for embossing a substantially uniform pattern of indentations across the width and along the length of the surface.

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**4,110,153**

## METHOD OF FORMING A MICROPOROUS DIAPHRAGM

**Thomas A. Rechlicz, Corpus Christi, Tex., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Sep. 8, 1977, Ser. No. 831,573**
**Int. Cl.[2] B44C *1/22*; C03C *15/00, 25/06***
**U.S. Cl. 156—633** **9 Claims**

1. A method of forming an unsintered, wettable, microporous polyfluorocarbon diaphragm comprising:

maintaining a nonwoven mat of a leachable fibrous material in contact with the external surfaces of a polyfluorocarbon film while hot pressing the polyfluorocarbon film above the flow temperature thereof but below the thermal decomposition temperature thereof; and

thereafter leaching out the fibrous material.

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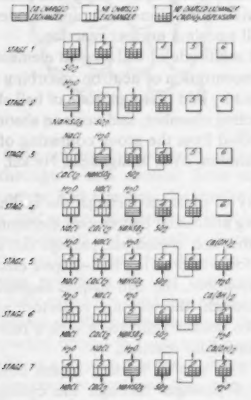
**4,110,154**

## METHOD FOR MAKING A SOLUBLE SULFITE ADDITIVE FOR USE IN A PULP MAKING PROCESS

**Alpo Ora, Rauma, Finland, assignor to Rauma-Repola OY, Finland**

**Continuation of Ser. No. 660,232, Feb. 23, 1976, abandoned. This application Jul. 8, 1977, Ser. No. 814,021**
**Claims priority, application Finland, Mar. 20, 1975, 750831**
**Int. Cl.[2] D21C *11/02***
**U.S. Cl. 162—36** **8 Claims**



1. In a process for manufacturing pulp by the sodium base sulfite digestion of wood wherein waste liquor from the digestion stage is evaporated, burned, and recovered as sodium carbonate and sodium sulfide, in which process there occur losses of sodium, the improvement which comprises making up said losses of sodium by:

(a) passing a solution of calcium bisulfite free from organic substance through a strongly acidic cation exchange resin in the sodium form having sulfonic acid groups as the exchange centers to obtain a sodium bisulfite effluent;

(b) adding said obtained sodium bisulite effluent as makeup to the digestion stage of the pulp manufacturing process;

(c) regenerating said cation exchange resin by passing therethrough a solution of sodium chloride;

(d) washing the resin with water; and

(e) cyclically repeating steps (a), (b), (c), and (d).

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**4,110,155**

## METHOD OF MANUFACTURING SYNTHETIC RESIN COATED PAPERS

**Nobuhiko Minagawa, and Tomoaki Ozaki, both of Fujimiya, Japan, assignors to Fuji Photo Film Co., Ltd., Minami Ashigara, Japan**

**Continuation of Ser. No. 272,509, Jul. 17, 1972, abandoned. This application Dec. 16, 1974, Ser. No. 533,360**
**Claims priority, application Japan, Jul. 17, 1971, 46-53317**
**Int. Cl.[2] D21H *1/10***
**U.S. Cl. 162—135** **8 Claims**

1. In a method of manufacturing a laminate paper having a synthetic resin film coated on both surfaces of the paper substrate which comprises manufacturing a paper substrate and applying said resin film to both surfaces of said substrate, the same synthetic resin being applied to each surface, the improvement comprising preventing the occurrence of wavy deformations at or near the edge portions of the laminate paper by incorporating during manufacturing of said paper substrate a deliquescent salt in an amount of from about 0.5 to 5% by weight based on the weight of said paper substrate, and adjusting the water content of said paper substrate to 6 to 10% by weight during said manufacturing and applying said resin film while said substrate has said water content.

7. A laminate paper having synthetic resin films coated on both surfaces of a paper substrate, the same synthetic resin being applied to each surface, said paper substrate containing a deliquescent salt at a level sufficient to adjust the water content of said paper substrate from about 6 to 10% by weight, said level being 0.5 to 5% by weight based on the weight of said paper substrate.

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**4,110,156**

## COMPACT PRESS AT THE WEB TRANSFER POSITION OF A PAPER MAKING MACHINE

**Wolf-Gunter Stotz, Ravensburg, and Helmut Hund, Vorberg, both of Fed. Rep. of Germany, assignors to Escher Wyss Limited, Zürich, Switzerland**

**Filed Jun. 6, 1977, Ser. No. 803,537**
**Claims priority, application Switzerland, Jun. 14, 1976, 7492/76**
**Int. Cl.[2] D21F *3/04, 3/06, 3/08, 3/10***
**U.S. Cl. 162—305** **6 Claims**

6. A paper-making machine roll press comprising:

wire means over which passes a web of paper containing water in a predetermined direction of travel;

a suction press roll positioned to cooperate with said wire;

a press felt trained about said suction press roll;

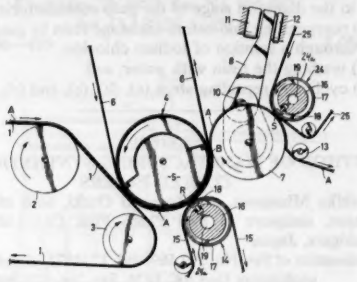
a take-off press roll cooperating with the suction press roll to form a press station;

said take-off press roll serving for the transfer of the web of paper from the suction press roll and for delivering the same downstream of the paper-making machine with respect to said predetermined direction of travel of said web of paper;

means cooperating with said suction press roll for providing an additional press station at the region of the suction press roll in advance of the press station with the take-off press roll;

said means defining said additional press station comprising a contact-pressure roll;

a press felt trained about said contact-pressure roll, to thereby impart to said additional press station a greater water drainage effect for the web of paper than at said press station at the take-off press roll;



said contact-pressure roll comprising a hydrostatic controlled deflection roll embodying a shell and a fixed support; and

means mounting said shell to be rotatable about its lengthwise axis and displaceable in the press direction relative to said fixed support.

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**4,110,157**

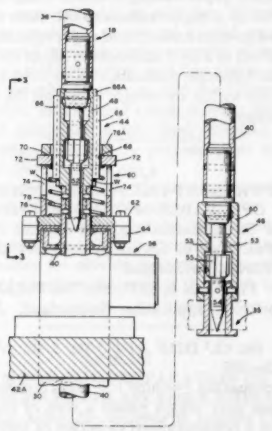
**INDUSTRIAL TECHNIQUE**

**Felix Stanley Jabsen, Lynchburg, Va., assignor to The Babcock & Wilcox Co., New York, N.Y.**

**Filed Nov. 10, 1976, Ser. No. 740,637**

**Int. Cl.[2] G21C *7/08***

**U.S. Cl. 176—36 C** **6 Claims**



1. An apparatus for coupling and rotatably securing a control rod system in a nuclear reactor of the type having at least one control rod assembly, a fuel assembly and drive means that longitudinally translates the control rod assembly within the fuel assembly, which comprises: a shaft disposed in axial alignment with and releasably coupled at one end to the control rod assembly, the shaft being releasably coupled at its other end to the drive means; a locking device surrounding the shaft including a housing having a longitudinally aligned slot and, a ring member having an inner slot and an outer ear portion extending through the housing slot for guided translational movement of the ring member; a key member axially aligned and outwardly extending on the shaft; the inner seat of the ring member cooperating with the key member of the shaft to permit the reciprocal movements of the control rod assembly and to secure the control rod system from rotation.

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**4,110,158**

**CORE REACTOR AND METHOD OF OPERATING SAME**

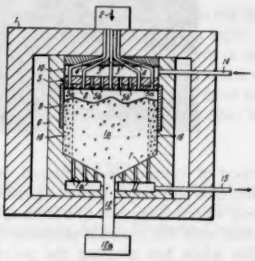
**Vladimir Maly, and Eberhard Teuchert, both of Jülich, Fed. Rep. of Germany, assignors to Kernforschungsanlage Jülich Gesellschaft mit beschrankter Haftung, Julich, Fed. Rep. of Germany**

**Continuation of Ser. No. 508,407, Sep. 23, 1974. This application Oct. 19, 1976, Ser. No. 733,698**

**Claims priority, application Fed. Rep. of Germany, Sep. 22, 1973, 2347817**

**Int. Cl.[2] G21C *15/02***

**U.S. Cl. 176—58 PB** **7 Claims**



1. A gas-cooled nuclear reactor comprising

(a) a generally cylindrical container,

(b) a layer of graphite approximately one meter in thickness lining the inside walls of the container and forming a ceiling reflector, a side reflector and a bottom reflector, the graphite reflectors encompassing a single reaction chamber,

(c) means introducing a cooling gas through the ceiling reflector into the reaction chamber and withdrawing the gas from the reaction chamber through the bottom reflector for maintaining the reaction chamber at a desired operating temperature,

(d) a first multitude of ball-shaped elements substantially filling the reaction chamber, the multitude of ball-shaped elements comprising an advantageous mixture of fissionable material, fertile material and moderator material which will sustain a nuclear reaction,

(e) a second multitude of ball-shaped elements containing a higher concentration of neutron absorbing substance than is contained by said first multitude of ball-shaped elements in the reaction chamber, said neutron absorbing substance being selected from the group consisting of; boron, Gadolinium, Hafnium, Iron, Manganese, Nickel, Plutonium and Thorium,

(f) a plurality of passages through the ceiling reflector for introducing additional ball-shaped elements into the reaction chamber and at least one passage through the bottom reflector for withdrawing ball-shaped elements from the reaction chamber, the ball-shaped elements being introduced through the ceiling reflector and withdrawn through the bottom reflector a such a rate as to maintain said nuclear chain reaction,

(g) at least two sets of feeding means connected to said plurality of passages through the ceiling reflector for feeding said ball-shaped elements through the passages into the reaction chamber, a first of the two sets of feeding means being arranged to only feed said second multitude of ball-shaped elements to an outer marginal zone of the reaction chamber.

4,110,159

## METHOD OF FABRICATING NUCLEAR FUEL

Harvey Robert Lee, Georgetown, Canada, assignor to Canadian General Electric Company Limited, Ontario, Canada

Filed Mar. 7, 1977, Ser. No. 774,928
Claims priority, application Canada, Mar. 12, 1976, 247800
Int. Cl.² G21C 5/18
U.S. Cl. 176—68 6 Claims

1. A nuclear fuel form based on an initially porous body comprising at least one material selected from the group consisting of uranium, thorium and plutonium and the oxides thereof having at least one solid additive impregnated therein to a predetermined extent, selected from the group consisting of nuclear fissile material and burnable poisons providing a controlled variation of additive as an additive concentration gradient having maximum additive concentration at an outer face of said form and diminishing in value with increase in distance from said outer face, extending through a portion of the form.

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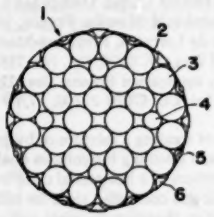
4,110,160

## FUEL ASSEMBLY SPACER WITHIN THE COOLANT DUCT

Kiyozumi Hayashi, Toride; Takeo Ohta, Sagamihara, and Tetsuo Kobori, Mito, all of Japan, assignors to Doryokuro Kakunenryo Kaihatsu Jigyodan, Tokyo, Japan

Filed Apr. 26, 1977, Ser. No. 791,147
Claims priority, application Japan, Apr. 26, 1976, 51-52279
Int. Cl.² G21C 3/30
U.S. Cl. 176—78 7 Claims




1. A spacer for a nuclear fuel assembly for positioning in a coolant duct through which coolant flows to remove heat generated in nuclear fuel elements during the operation of a nuclear reactor, said spacer comprising a structure for holding a plurality of fuel elements and a plurality of projecting springs having uniform spring strengths disposed symmetrically around the outer periphery of said spacer structure, said springs in their fully expanded condition extending beyond the peripheral dimension of the maximum inner diameter of said coolant duct reached during the course of reactor operation, whereby as uniform a gap as possible is formed between the inner wall of the coolant duct and the outer surface of the spacer structure when the spacer structure with fuel elements therein is positioned in the coolant duct and symmetry of the flow of the coolant in the section of the coolant duct is maintained even if there is an eventual increase of the inner diameter of the coolant duct during the course of reactor operation.

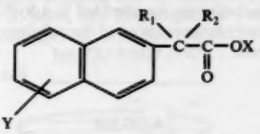
4,110,161

## PROCESS FOR INHIBITING PLATELET AGGREGATION

Neel C. Sekhar, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 514,839, Oct. 15, 1974, Pat. No. 4,033,816, which is a continuation of Ser. No. 370,990, Jun. 18, 1973, abandoned, which is a continuation-in-part of Ser. No. 276,714, Jul. 3, 1972, abandoned. This application Mar. 7, 1977, Ser. No. 775,420
Int. Cl.² C12B 3/00, 9/00; A61K 35/14, 31/235
U.S. Cl. 195—1.8 2 Claims

1. A process for inhibiting platelet aggregation in vitro comprising the addition of an effective amount for inhibiting platelet aggregation of a compound of the formula:




wherein Y is lower alkyl of 1 to 8 carbon atoms, cyclopropyl, ethinyl, $-CF_3$, —F, —Cl, $-OCH_3$, $-OCH_2OCH_3$, $-SCH_3$, $-SCHF_2$, $-SCH_2OCH_3$, acetyl; $R_1$ and $R_2$ are H, $CH_3$, $CHF_2$, or taken together are $=CH_2$ or $=CF_2$; and X is lower alkyl of 1 to 8 carbon atoms, to whole blood or platelet-rich concentrates.

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4,110,162

## PRODUCTION OF A POLYSACCHARIDE UNDER CARBON LIMITING CONDITIONS

Renton Clive Righelato, and Trevor Rodney Jarman, both of Reading, England, assignors to Tate & Lyle Limited, London, England

Filed May 20, 1977, Ser. No. 798,761
Claims priority, application United Kingdom, May 28, 1976, 22319/76
Int. Cl.² C12D 13/04
U.S. Cl. 195—31 P 6 Claims

1. In a process for the production of a polysaccharide comprising subjecting to continuous cultivation a bacterium of the species *Azotobacter vinelandii* under aerobic conditions in an aqueous culture medium containing as essential ingredients at least one monosaccharide or disaccharide as carbon source and sources of phosphate, molybdenum, iron, magnesium, potassium, sodium, calcium and sulphate, said medium containing a source of nitrogen selected from the group consisting of a fixed source of nitrogen and gaseous nitrogen, oxygen being supplied during cultivation, the pH in the medium during cultivation being maintained within the range of about 6.0, to about 8.2 and recovering said polysaccharide, the improvement comprising maintaining the concentration of the saccharide carbon source in the medium so that it is limiting the growth nutrient.

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4,110,163

## BETA-GLUCANASE

Kirsten Hjortshoj, Vaerloese, and Knud Aunstrup, Farum, both of Denmark, assignors to Novo Industri A/S, Bagsvaerd, Denmark

Continuation of Ser. No. 443,324, Feb. 19, 1974, abandoned. This application Oct. 6, 1976, Ser. No. 730,014
Claims priority, application United Kingdom, Feb. 28, 1973, 09844/73
Int. Cl.² C07G 7/02; C12C 7/00, 9/02
U.S. Cl. 195—62 5 Claims

1. A process for the production of an endo-beta-glucanase preparation, which will hydrolyze the beta-glucan in barley and related glucans, which comprises cultivating *Aspergillus phoenicis* at between 25° and 30° C in a submerged culture in a

nutrient medium containing assimilable sources of carbon and nitrogen together with other essential nutrients under aerobic conditions, thereafter recovering endo-beta-glucanase from the broth.

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**4,110,164**

## AGGLOMERATED FIBROUS CELLULOSE

**Robert F. Sutthoff; Robert V. MacAllister, and Khaja Khaleeluddin, all of Clinton, Iowa, assignors to Standard Brands Incorporated, New York, N.Y.**

**Filed Apr. 19, 1977, Ser. No. 788,728**
**Int. Cl.² C07G *7/02***
**U.S. Cl. 195—63** **18 Claims**

1. An agglomerated fibrous ion exchange cellulose composite wherein the cellulose is embedded in a hydrophobic polymer and relatively large portions of the cellulose have enzymes adsorbed thereon.

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**4,110,165**

## PROCESS FOR THE PRODUCTION OF CLAVULANIC ACID

**Martin Cole, Dorking; Thomas Trevor Howarth, Rudwick, and Christopher Reading, Southwater, all of England, assignors to Beecham Group Limited, Great Britain**

**Division of Ser. No. 569,007, Apr. 17, 1975. This application Sep. 24, 1976, Ser. No. 726,061**
**Claims priority, application United Kingdom, Apr. 20, 1974, 17410/74; Jun. 21, 1974, 27715/74; Oct. 9, 1974, 43651/74; Dec. 11, 1974, 53525/74**
**Int. Cl.² C12D *9/14***
**U.S. Cl. 195—80 R** **19 Claims**

1. A process for the production of clavulanic acid or a salt thereof which comprises cultivating a strain of *Streptomyces clavuligerus* in a suitable medium containing assimilable sources of carbon, nitrogen and mineral salt and isolating the clavulanic acid or salt thereof from the culture medium.

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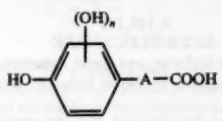
**4,110,166**

## PROCESS FOR THE PRODUCTION OF NOCARDICIN A

**Shigeru Mori, Nishinomiya; Shigeyoshi Ohsawa, Takatsuki; Hatsuo Aoki, Ikeda, and Hiroshi Imanaka, Osaka, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan**

**Filed Nov. 15, 1976, Ser. No. 742,013**
**Claims priority, application Japan, Nov. 19, 1975, 50-139405**
**Int. Cl.² C12D *9/14***
**U.S. Cl. 195—96** **29 Claims**

1. In the process for preparing Nocardicin A by culturing *Nocardia uniformis* subsp. tsuyamanensis in a fermentation medium, the improvement which comprises, to the fermentation medium, adding at least one additive selected from shikimic acid, a carboxylic acid of the formula:




(I)

wherein

A is alkylene group having hydroxy, amino, acylamino or oxo group, and

*n* is an integer of 0–4;

glycine, alanine, serine, homoserine, α-aminobutyric acid and α,β-diaminopropionic acid; and their ester, acid amide and hydrazide derivatives at the carboxy in a concentration of 2–0.001% by weight.

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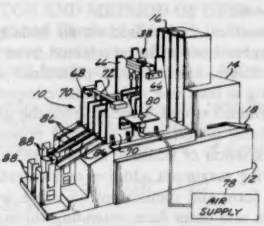
**4,110,167**

## SEMI-AUTOMATED SLIDE PROCESSOR DEVICE

**John Melnyk, 1316 Cerritos Dr., Laguna Beach, Calif. 92651**

**Filed Jul. 12, 1977, Ser. No. 814,854**
**Int. Cl.² C12K *1/00***
**U.S. Cl. 195—127** **6 Claims**




1. A semi-automated slide processor device for preparing simultaneously a plurality of slides of cell cultures for cytogenetic analysis, comprising:

stacking means for stacking a supply of slides; including a plurality of stacks of said slides;

cell dispensing means for releasing a suspension of cells simultaneously on each of a plurality of slides, said cell dispensing means including a manifold means having a plurality of openings covered by an elastomeric membrane, and including plunger means for producing pressure on said manifold means to release said suspension of cells;

cell dispersal means for spreading a suspension of cells into a film on each of said slides simultaneously; and

means for moving slides from said stacking means to a location beneath said cell dispensing means and then to a location beneath said cell despersal means, said means for moving slides including a plurality of longitudinal channels for passage of slides.

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**4,110,168**

## PROCESS FOR THE SEPARATION OF TARRY DUSTS FROM COKE OVEN GAS

**Henri Brice, Saint-Avold Moselle, France, assignor to Houilleres du Bassin de Lorraine, Freyming-Merlebach, France**

**Filed Dec. 29, 1976, Ser. No. 755,450**
**Claims priority, application France, Jan. 22, 1976, 76 01648**
**Int. Cl.² C10B *27/00, 27/04***
**U.S. Cl. 201—4** **5 Claims**

1. In a process of treating a mixture of by-products resulting during charging and distilling bituminous coal, for the production of coke, chambers of a horizontal coke oven battery comprising a hydraulic gas collecting main for offtake of the distillation gas denoted as charging gas main and a principal crude-gas collecting main,

wherein opening and closing means providing substantially fluid-tight closure are disposed at least between each chamber and said charging gas main,

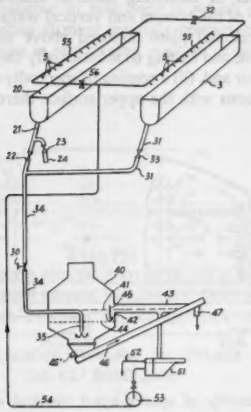
wherein said mixture comprises gases, dusts, tar and water vapor, the temperature of said mixture being in the range from 600° to 800° C.,

wherein ammoniacal water is employed in said charging gas and crude-gas collecting mains to cool said mixture, which ammoniacal water-containing mixture is denoted as a mix,

wherein said mix which is discharged from the charging gas and crude-gas collecting mains is subjected to a step of decantation to obtain clarified ammoniacal water and a product containing tar and dusts separated from said ammoniacal waters, and wherein said clarified ammoniacal water is recycled to the mains,

the improvement consisting of adjusting, at any time during the process up to and during the step of decantation, the

weight ratio of said dusts to said tar to a range substantially between 1.3 and 1.6, whereby in the step of decantation said product of tar and dusts is in substantially solid form.



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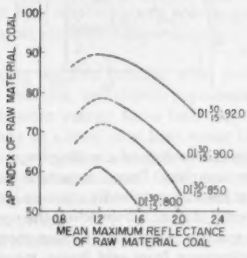
**4,110,169**

## METHOD FOR MANUFACTURING HIGH-STRENGTH FORMED COKE IN SLIGHT MUTUAL AGGLOMERATION USING HORIZONTAL TYPE COKE OVEN BATTERY

**Gyoichi Suzuki, Tokyo; Sanseki Moriguchi, Yokohama; Takashi Miyazu, Tokyo; Yasuo Okuyama, Yokohama; Masahiro Muroya, Yokohama; Mamoru Yanagiuchi, Yokohama; Takashi Mori, Yokohama, and Mitsutoshi Miura, Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan**

**Continuation-in-part of Ser. No. 665,051, Mar. 8, 1976, abandoned. This application Oct. 6, 1977, Ser. No. 839,897**
**Claims priority, application Japan, Apr. 1, 1975, 50-38562**
**Int. Cl.[2] C10B *53/08, 57/04***
**U.S. Cl. 201—6** **2 Claims**




1. In a method for manufacturing a high-strenght formed coke in a slight mutual agglomeration solely from formed coal in a conventional horizontal type coke oven battery, which comprises sieving a plurality of different types of raw material coal fines to a size not exceeding 1.5 mm., mixing said plurality of different types of raw material coal fines thus sieved with a binder, forming same to produce a formed coal, charging only said formed coal into said coke oven battery, and then carbonizing said formed coal in said coke oven battery under conventional carburizing conditions to produce a formed coke, the improvement characterized by:

blending said plurality of different types of coal fines after said sieving step to form a mixture of coal fines so as to satisfy the following conditions:

(a) AP index: 75 at the minimum,

(b) Mean maximum reflectance: 1.20% at the minimum, and

(c) A [dilatation]-[contraction] value of from −2 to +5% when carbonized under conventional conditions in said coke oven battery at a heating rate of 5° C./min. (350° – 600° C.);

whereby said formed coke has a percentage of co-agglomeration within a range of from 40 to 90%.

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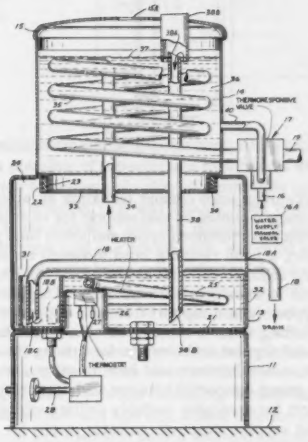
**4,110,170**

## HOME WATER DISTILLER

**Fred C. Kirschman, Briardale Rte. 2, Bismarck, N. Dak. 58501, and Wallace B. Bolte, Box 204, Regent, N. Dak. 58650**

**Filed Apr. 28, 1976, Ser. No. 681,051**
**Int. Cl.[2] B01D *3/42***
**U.S. Cl. 202—160** **8 Claims**

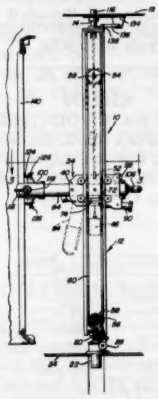


1. A home water distilling apparatus comprising a housing defining a boiling chamber, heating means to heat and evaporate water in said boiling chamber, a water level control in said boiling chamber comprising drain means opening to said boiling chamber and permitting flow of excess water from said boiling chamber over a weir when the water level exceeds the control level of said weir in said boiling chamber, means associated with said housing defining a preheat water chamber having an inlet and a supply passageway forming an outlet from said preheat chamber to said boiling chamber and permitting free flow of water from said preheat chamber to said boiling chamber when the water level in the preheat chamber is above a desired level, said supply passageway opening to said boiling chamber below the control level of said weir, valve means to control flow of input water from a source to said preheat water chamber at the inlet to the preheat water chamber, means forming a condenser passageway having an inlet operatively connected to receive water vapor from said boiling chamber and having an outlet for distilled water, said means forming a condenser passageway being positioned to provide heat transfer from water vapor in the condenser passageway to water in said preheat water chamber, said valve means including a thermo responsive portion operable as a function of the temperature of distilled water in the condenser passageway to open said valve means to admit inlet water from a source to said preheat water chamber and permit flow through said supply passageway to said boiling chamber when the thermo responsive portion senses a temperature greater than a desired level.

## 4,110,171
## MECHANICAL JAMB CLEANER

William R. Baird, Sturgis; Kenneth O. Sutton, Morganfield, and Billy C. Baird, Sullivan, all of Ky., assignors to Saturn Machine & Welding Co., Inc., Sturgis, Ky.

Filed May 20, 1977, Ser. No. 798,869
Int. Cl.[2] C10B *43/04*
U.S. Cl. 202—241 16 Claims



1. A coke oven jamb cleaner including an upstanding support, a carriage mounted on said support for vertical reciprocation between predetermined upper and lower limit positions on said support, a jamb cleaning head mounted on said carriage for cleaning engagement with and vertical reciprocation along an adjacent upstanding jamb portion, a support structure, means supporting said support from said support structure for vertical shifting relative thereto, first drive means connected between said support and carriage for driving the latter along the former to and between said limit positions, reversible second drive means connected between said support structure and said support for reversibly variably shifting said support relative to said support structure, actuator means for said second drive means operative to sense upper and lower limits of an upstanding jamb portion with which said cleaning head is operatively associated and to actuate said second drive means to lower and raise said support relative to said support structure in response to sensing upper and lower limits, respectively, of said jamb, whereby the upper and lower limit positions of movement of said carriage relative to said support may be achieved by upward and downward shifting, respectively, of said support relative to said support structure when the vertical spacing between upper and lower limits of said jamb is less than the vertical spacing between upper and lower limit positions of vertical reciprocation of said carriage relative to said support.

## 4,110,172
## SOLAR ENERGY COLLECTING POND

John F. Spears, Jr., Mt. Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

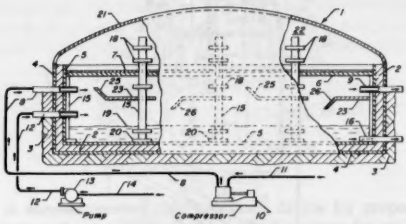
Continuation-in-part of Ser. No. 764,255, Jan. 31, 1977, and Ser. No. 764,256, Jan. 31, 1977. This application Mar. 28, 1977, Ser. No. 782,147
Int. Cl.[2] B01D *1/14*
U.S. Cl. 202—234 10 Claims

1. A solar energy collecing pond which comprises, in cooperative combination:

(a) a water-containing reservoir having bottom and vertical walls with an interior surface and said reservoir further having (i) at least one water inlet conduit communicating with water supply means, (ii) at least one water outlet conduit, (iii) at least one air inlet conduit communicating with air supply means and, (iv) at least one air outlet conduit, said air conduits being disposed above said water conduits;

(b) a layer of insulating material contacting the interior surface of the bottom and vertical walls of said reservoir;

(c) a horizontal plate disposed above said air and water conduits, and having (i) substantially the same area as said reservoir and, (ii) a coating of spectrally-selective material contiguous with the upper surface thereof;



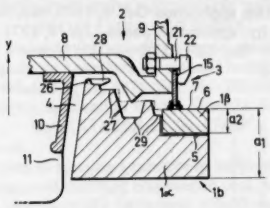

(d) a plurality of spaced-apart vertical support standards attached to said horizontal plate and in contact with the bottom of said reservoir; and,

(e) a transparent cover attached to the upper peripheral edges of said reservoir, and forming a dead air space above said horizontal plate.

## 4,110,173
## SEALING CLOSURE FOR AN OPENING OF A COKING OVEN

Kürt Dix, Bochum, Fed. Rep. of Germany, assignor to G. Wolf Jr. Kommanditgesellschaft, Bochum-Linden, Fed. Rep. of Germany

Filed Jan. 17, 1977, Ser. No. 759,852
Claims priority, application Fed. Rep. of Germany, Jan. 19, 1976, 2601707
Int. Cl.[2] C10B *25/06, 25/16*
U.S. Cl. 202—248 30 Claims




1. A closure for an opening of a coking oven, comprising a circumferentially complete frame mounted on the coking oven, bounding at least an outwardly open end of the opening and having a contact surface surrounding the open end of the opening with a spacing therefrom; a door receivable in the opening with a clearance from said frame; means for removably holding said door in a closing position thereof with respect to said frame for closing the opening; means for sealing said clearance, including at least one sealing member which includes an elongated rigid support element having a marginal portion juxtaposable with said contact surface and having longitudinally distributed projections, and a sealing element of resiliently yieldable material having an elongated recess in which said marginal portion of said support element is received to mount said sealing element on said support element, a sealing surface parallel to said recess and juxtaposable with said contact surface of said frame, and a plurality of cutouts communicating said recess with said sealing surface and adapted to accommodate said projections of said support element; and

means for connecting said support element to said door for an adjustment of the position of said support element relative to said door and for retaining said support element in an adjusted position thereof relative to said door in which said sealing surface of said sealing element sealingly contacts said contact surface of said frame in said closing position of said door.

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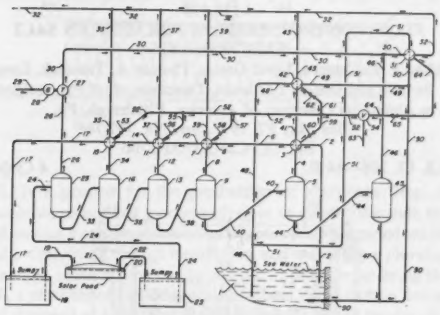
## 4,110,174
## POWER GENERATION AND POTABLE WATER RECOVERY FROM SALINOUS WATER

**Don B. Carson, Mt. Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.**

**Filed Dec. 16, 1976, Ser. No. 751,424**
**Int. Cl.² B01D** *3/06*
**U.S. Cl. 203—11** **11 Claims**



1. A process for simultaneously recovering potable water and generating power from a source of salinous water, which process comprises the sequential steps of:

(a) increasing the temperature of a first portion of said salinous water via indirect successive contact with a plurality of non-salinous vaporous phases which are (i) derived from said first salinous water portion and, (ii) obtained therefrom at elevated temperature and subatmospheric pressure;

(b) introducing said first salinous water portion into a solar radiation heat sink, and therein exposing said first portion to radiant solar energy for a time sufficient to raise its temperature to a level of at least about 135° F.;

(c) introducing the thus-heated first salinous water portion into the first of a series of flash separation zones, each succeeding one of which is maintained at a lower subatmospheric pressure, to provide a plurality of non-salinous vaporous phases, and through which the salinous liquid phase passes in series flow;

(d) introducing at least one of said vaporous phases into a turbine, and generating power from the resulting motion thereof;

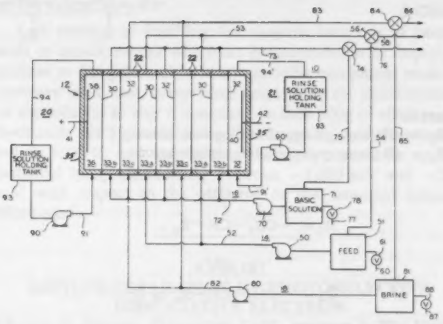
(e) indirectly contacting said first salinous water portion, prior to the introduction thereof into said solar radiation heat sink, with each of the remaining vaporous phases in said plurality, and in the order of increasing temperatures, and recovering potable water from said remaining plurality of non-salinous vaporous phases; and,

(f) indirectly contacting the exit vapors from said turbine with a second portion of said salinous water to recover additional potable water.

## 4,110,175
## ELECTRODIALYSIS METHOD

**Richard M. Ahlgren, Waukesha, and Burnett M. Schneider, Wind Lake, both of Wis., assignors to Aqua-Chem, Inc., Milwaukee, Wis.**

**Continuation-in-part of Ser. No. 701,111, Jun. 30, 1976, abandoned. This application Nov. 15, 1976, Ser. No. 742,360**
**Int. Cl.² B01D** *13/02;* **A23C** *21/00, 9/14*
**U.S. Cl. 204—180 P** **6 Claims**




1. A permeation separation process comprising providing an enclosure, a plurality of ion-selective membranes disposed in spaced relation to define a plurality of permeation cells within said enclosure wherein first and second ones of said membranes are anion-selective and are disposed in side-by-side relation to define a first one of said cells, and third and fourth ones of said membranes being cationselective membranes each disposed adjacent one of said first and second membranes and on the opposite sides thereof to define second and third cells adjacent said first cell, and an anode disposed on the side of said membranes most proximate to said third cell and a cathode on the side of said membranes most proximate to said second cell, passing a whey solution including lactate anions and hydrogen cations into said first cell, a basic solution containing metallic cations and hydroxyl anions into said second cell, and a carrier solution into said third cell, applying an electric field across said cells and between the anode and cathode, passing lactate anions through said first membrane and from said first cell into said third cell, passing hydroxyl anions from said second cell into said first cell for combination with the hydrogen cations therein to form water whereby the ionic concentration of said first cell is decreased, withdrawing from said first cell a whey solution having an acid concentration less than that of said first solution, withdrawing from said second cell a basic solution which is less concentrated than that passed into said cell and substantially uncontaminated by said lactate anions, and withdrawing from said third cell the lactate anions along with said carrier solution.

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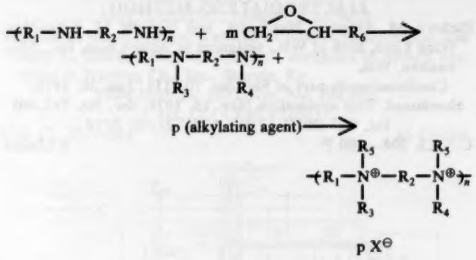
## 4,110,176
## ELECTRODEPOSITION OF COPPER

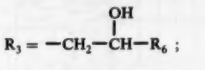
**Hans-Gerhard Creutz, deceased, late of Yale, Mich. (by Katharina A. Creutz, administratrix), and Roy Wilbur Herr, Troy, Mich., assignors to Oxy Metal Industries Corporation, Warren, Mich.**

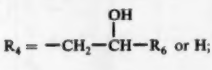
**Continuation-in-part of Ser. No. 557,443, Mar. 11, 1975, abandoned. This application May 4, 1977, Ser. No. 793,701**
**Int. Cl.² C25D** *3/38*
**U.S. Cl. 204—52 R** **6 Claims**

1. A bath for electrodepositing copper comprising an aqueous acidic copper plating bath having dissolved therein about 0.04 to 1000 mg/l of a reaction product of an alkoxylated polyalkylenimine with an alkylating agent as defined below:

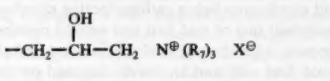


wherein:
$R_1$ = alkylene group of 1–6 carbon atoms;
$R_2$ = alkylene group of 1–6 carbon atoms;





$R_5$ =
alkyl group of 1–4 carbon atoms;
aralkyl;
alkenyl group of 2–4 carbon atoms;
alkynyl group of 2–4 carbon atoms;
alkylene sulfonate group of 1–4 carbon atoms (e.g. $-CH_2CH_2CH_2SO_3^{\ominus}$); and



$R_6$ = H, $-CH_3$, $-CH_2OH$;
$R_7$ = alkyl group of 1–4 carbon atoms;
$m$ = 1 to 2;
$X^{\ominus}$ = $Cl^{\ominus}$, $Br^{\ominus}$, $CH_3SO_4^{\ominus}$;
$p$ = 1 to 2 and
$n$ = 7.0 to 23,500.

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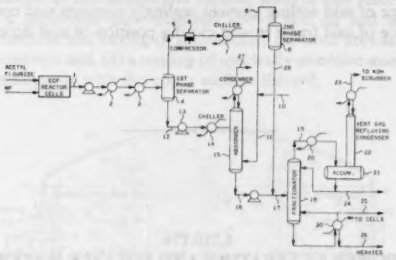
**4,110,177**

## PROCESS FOR RECOVERY AND PURIFICATION OF A PERFLUOROCARBOXYLIC ACID FLUORIDE FROM ELECTROCHEMICAL CELL FLUORINATION EFFLUENT

**Franklin T. Barber, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Nov. 16, 1977, Ser. No. 852,162**
**Int. Cl.[2] C25B** *3/08*
**U.S. Cl. 204—59 F** **10 Claims**

1. The recovery of trifluoroacetylfluoride from a reaction mass stream obtained from an electrochemical fluorination zone in which electrochemical fluorination of acetylfluoride to produce trifluoroacetylfluoride is effected which comprises: chilling said stream under pressure to condense a substantial portion of the constituents thereof, passing the chill stream into a phase separation zone, in said phase separation zone separating said stream into at least a first vapor stream and a first liquid stream, removing vapors from said zone, further chilling and passing the same into a second zone, in said second zone separating at least one further vaporous stream from at least one further liquid stream, pumping and chilling said first liquid stream to subcool the same and then passing it into an absorption zone as an absorption medium therefore, passing said further vaporous stream from said second zone into said absorption zone into absorption contact with said first liquid stream therein to recover into said medium substantial quantities of trifluoroacetylfluoride, other reaction products and HF



therefrom, removing thus enriched absorption medium from said absorption zone and subjecting the same to fractionation in a fractionation zone to recover the trifluoroacetylfluoride therefrom.

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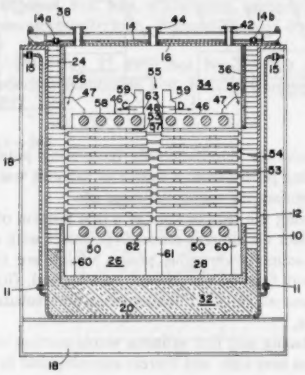
**4,110,178**

## FLOW CONTROL BAFFLES FOR MOLTEN SALT ELECTROLYSIS

**Alfred F. LaCamera, Level Green; Thomas A. Trzeciak, Lower Burrell, and Donald L. Kinosz, Tarentum, all of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.**

**Filed May 17, 1977, Ser. No. 797,746**
**Int. Cl.[2] C25C** *3/00, 3/06*
**U.S. Cl. 204—64 R** **4 Claims**



1. An electrolytic cell for producing metal in a bath of molten salt, said bath being capable of flowing in the cell to remove molten metal from spaces provided between superposed electrodes of the cell, said cell including

a bath of molten salt having an upper level within the cell,

at least one vertical stack of superposed electrodes located in the bath, the uppermost electrode of the stack being located beneath the upper level of the bath, the vertical stack being arranged to provide spaces between adjacent electrodes for the production of metal, and passages within the cell that extend vertically between upper and lower regions of the cell, said vertical passages permitting respective upward and downward flow of the bath, and

a baffle located adjacent the passage for the upward flow of the bath and extending vertically above the uppermost electrode of the vertical stack, said baffle being effective to increase the flow of the bath and molten metal in the spaces between adjacent superposed electrodes of the vertical stack, and to direct the upward flow of the bath

that occurs in the upward flow passage laterally over the uppermost electrode but beneath the upper level of the bath, the lateral direction of the bath beneath its upper level being effective to substantially reduce opportunity for molten metal to break through the upper level of the bath.

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4,110,179

## PROCESS AND DEVICE FOR THE PRODUCTION OF ALUMINIUM BY THE ELECTROLYSIS OF A MOLTEN CHARGE

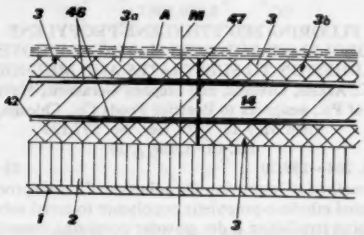
Theodor Tschopp, Zollikon, Switzerland, assignor to Swiss Aluminium Ltd., Chippis, Switzerland

Filed Apr. 28, 1977, Ser. No. 791,973

Claims priority, application Switzerland, May 13, 1976, 6015/76

Int. Cl.[2] C25C *3/08, 3/06*

U.S. Cl. 204—67 15 Claims




1. In a process for the production of aluminum from an aluminum compound by electrolysis in an electrolytic cell, the cell having a center, at least two edges, a predetermined width and a containing molten electrolyte, and including a plurality of anodes immersed in the electrolyte, a carbon layer lining the cell, a plurality of cathode bars embedded in the carbon lining, and disposed at a predetermined distance from the anodes, the aluminum compound being disposed between the anodes and the cathodes, the steps comprising:

passing a current through the cell,

precipitating aluminum from the aluminum compound, the aluminum serving as a cathode, and

reducing progressively the area of electrical contact between the cathode bars and the carbon lining from the center of the cell to the edges thereof, so that the carbon lining draws operatively substantially the same current per unit area from the precipitated aluminum over approximately the whole width of the cell.

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4,110,180

## PROCESS FOR ELECTROLYSIS OF BROMIDE CONTAINING ELECTROLYTES

Antonio Nidola, Milan, Italy; Vittorio De Nora, Nassau, The Bahamas, and Placido M. Spaziante, Milan, Italy, assignors to Diamond Shamrock Technologies S.A., Geneva, Switzerland

Continuation-in-part of Ser. No. 680,984, Apr. 28, 1976, abandoned. This application Apr. 20, 1977, Ser. No. 789,216

Int. Cl.[2] C25B *1/24*

U.S. Cl. 204—128 10 Claims

1. In the method of electrolyzing an aqueous electrolyte containing bromide ions to form bromine in an electrolysis cell equipped with a cathode and an anode comprising at least a valve metal base, the improvement comprising the valve metal base being titanium alloyed with at least one member of the group consisting of tantalum, niobium, hafnium, vanadium and zinc in an amount effective to maintain in the electrolyte a breakdown voltage at the anode base in excess of 2 volts (NHE).

4,110,181

## METHOD OF HANDLING AQUEOUS SOLUTIONS OF ALKALI METAL HYDROXIDES THAT ARE CONCENTRATED IN RESPECT OF ALKALI METAL HALIDES

Guy Sluse, Rixensart, and Francois Dujardin, Brussels, both of Belgium, assignors to Solvay & Cie, Belgium

Filed Sep. 27, 1976, Ser. No. 727,011

Claims priority, application France, Oct. 8, 1975, 75 31214

Int. Cl.[2] C23F *13/00*

U.S. Cl. 204—147 5 Claims

1. A method of handling hot aqueous solutions of caustic soda or caustic potash which are concentrated with respect to sodium or potassium chloride, in metallic equipment made of ordinary mild steel, comprising: controlling the concentration of the solution so that it contains less than 500g of alkali metal hydroxide per kg, maintaining the temperature of the solution below 130° C, and maintaining the equipment at an anodic potential lying substantially between −1,000 mV and −200 mV with respect to the potential of the saturated calomel electrode.

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4,110,182

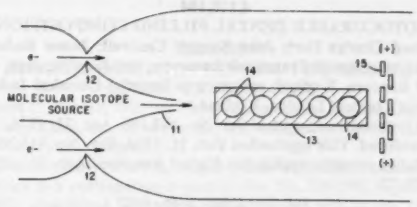
## ISOTOPE SEPARATION BY PHOTOSELECTIVE DISSOCIATIVE ELECTRON

Charles G. Stevens, Pleasanton, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jun. 17, 1976, Ser. No. 696,997

Int. Cl.[2] B01J *1/10*

U.S. Cl. 204—157.1 R 13 Claims




1. A method for separating isotopes by photoselective dissociative electron attachment to molecular species in which an element is present in a plurality of isotopes, those molecules containing a first such isotope being capable of absorbing radiation at a given frequency corresponding to a predetermined vibrationally excited state having associated therewith an electron capture energy region substantially non-overlapping with the electron capture energy ranges associated with the lowest vibrational states of the molecular species to a substantially greater degree than those molecules containing a second such isotope, said molecular species being in the gaseous phase, which method comprises:

cooling the molecular species to a temperature at which substantially all the molecules contained therein reside in the lowest vibrational states thereof;

subjecting the molecular species to radiation at the given frequency, thereby exciting those molecules containing said first isotope to said predetermined vibrationally excited state without substantially vibrationally exciting those molecules containing a second such isotope;

dissociating the vibrationally excited molecules by electron capture dissociation into a neutral product and a negatively charged product without substantially dissociating the unexcited by contacting the molecular stream with electrons having an energy range corresponding to said electron capture energy region associated with said predetermined vibrationally excited state, one of the dissociation products being enriched in said first isotope; and

separating the dissociation product enriched in said first isotope from the reaction system.

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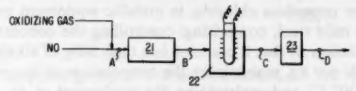
**4,110,183**

## PROCESS FOR DENITRATION OF EXHAUST GAS

**Isao Furuta, and Yoshimi Takiguchi, both of Kobe, Japan, assignors to Kobe Steel, Ltd., Kobe, Japan**

**Filed Jul. 29, 1977, Ser. No. 820,316**
**Claims priority, application Japan, Jul. 31, 1976, 51-91760**
**Int. Cl.[2] B01J *1/10***
**U.S. Cl. 204—157.1 R** **9 Claims**




1. A process for removing nitrogen oxides from exhaust gases which comprises:

introducing an oxidizing gas into the exhaust gas to oxidize the nitrogen monoxide contained therein to nitrogen dioxide and thereby form a first oxidized exhaust gas;

irradiating said first oxidized gas with actinic light to oxidize said nitrogen dioxide to nitric acid and thereby form a second oxidized exhaust gas; and

removing said nitric acid from said second oxidized exhaust gas.

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**4,110,184**

## PHOTOCURABLE DENTAL FILLING COMPOSITIONS

**Edward Charles Dart; John Burnett Cantwell; James Rodney Traynor; Joseph Franciszek Jaworzyn, and Jozef Nemcek, all of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England**

**Continuation-in-part of Ser. No. 463,145, Apr. 22, 1974, abandoned. This application Oct. 11, 1974, Ser. No. 514,289**
**Claims priority, application United Kingdom, Apr. 24, 1973, 19270/73**
**Int. Cl.[2] C08F *2/46, 4/00***
**U.S. Cl. 204—159.23** **1 Claim**

1. A dental filling composition comprising

(a) from 60 to 80% by weight of the composition of an inorganic particulate filler selected from glass, quartz of silica of which at least 50% of the particles have a maximum dimension of not greater than 300 microns, and

(b) a polymerisable material comprising:

a polymerisable prepolymer being the reaction product of a urethane prepolymer and 2-hydroxyethyl methacrylate; the said urethane prepolymer being the reaction product of a di-isocyanate selected from the group consisting of 4,4'-diisocyanatodiphenylmethane, hexamethylene di-isocyanate, 4,4'-dicyclohexylmethane di-isocyanate and 2,4-tolylene di-isocyanate, and a diol being the condensate obtained by reacting 2,2-bis-(p-hydroxyphenyl)propane and propylene oxide in a molar ratio of 1:2;

up to 100% by weight of the polymerisable prepolymer of methacrylic acid or an ester of methacrylic acid selected from the group consisting of methyl methacrylate, ethylene glycol dimethacrylate, hydroxyethyl methacrylate, triethylene glycol dimethacrylate and allyl methacrylate;

and from 0.01 to 10% by weight of the polymerisable material of a photosensitive catalyst comprising a photosensitiser selected from the group consisting of fluorenone, benzil, camphorquinone and α-naphthil, and a reducing agent being dimethylaminoethyl methacrylate.

**4,110,185**

## IRRADIATION STERILIZATION OF SEMI-CRYSTALLINE POLYMERS

**Joel Williams, Cary; Terry Dunn, and Vivian Stannett, both of Raleigh, all of N.C., assignors to Becton, Dickinson and Company, Rutherford, N.J.**

**Filed Nov. 10, 1976, Ser. No. 740,618**
**Int. Cl.[2] C08F *2/54, 8/18;* A61L *1/00;* C08J *3/28***
**U.S. Cl. 204—159.2** **19 Claims**

1. A process for sterilizing a semi-crystalline polymer, comprising:

subjecting to a sterilizing amount of high energy radiation a semi-crystalline polymer having a crystalline content of from 20-90% and having incorporated therein a mobilizing amount of a non-crystalline liquid mobilizing additive which increases the free volume of the polymer and retains the flexibility thereof to thereby produce a sterilized polymer which retains its flexibility.

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**4,110,186**

## FLUORINATED ETHYLENE-PROPYLENE COPOLYMER POWDERS HAVING IMPROVED ADHESION TO SUBSTRATES AND METHOD

**Barry C. Arkles, Oreland, and Stephen Gerakaris, Havertown, both of Pa., assignors to Beatrice Foods Co., Chicago, Ill.**

**Filed May 13, 1975, Ser. No. 577,128**
**Int. Cl.[2] C08F *2/54***
**U.S. Cl. 204—159.20** **13 Claims**

1. A method of improving the adhesion of a melt-processible fluorinated ethylene-propylene copolymer to metal substrates, comprising irradiating a dry powder consisting essentially of melt-processible tetrafluoroethylene-hexafluoropropylene copolymer with about 0.5 to 6 megarads of radiation in a gaseous oxygen-containing atmosphere to increase the melt index of the copolymer.

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**4,110,187**

## ULTRAVIOLET CURABLE POLYESTER BINDER AND COATING FORMULATION

**Cephas H. Sloan, and James G. Pacifici, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Sep. 2, 1977, Ser. No. 830,298**
**Int. Cl.[2] C08G *18/00, 63/00***
**U.S. Cl. 204—159.19** **12 Claims**

1. A radiation curable composition comprising a solution of

(A) from 5 to about 50 percent by weight of a polyester of terephthalic acid esters and a glycol of from about 60 mole percent to 100 mole percent 1,2-propylene glycol and from 0 to about 40 mole percent ethylene glycol; said polyester having an inherent viscosity of from about 0.05 to about 0.60 in a 60/40 parts by weight solution of phenol/tetrachloroethane at 25° C. at a concentration of 0.5 g. of polyester in 100 ml. of said solvent;

(B) from 95 to 50 percent by weight of an ethylenically unsaturated photopolymerizable compound; and

(C) An effective amount of a photoinitiator.

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**4,110,188**

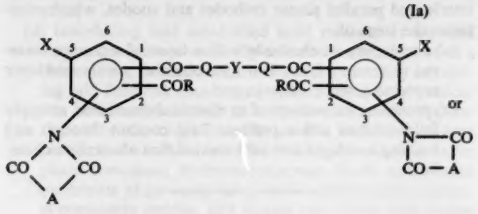
## CROSSLINKABLE MIXTURES OF BIS-IMIDYL DERIVATIVES

**Roland Darms, Therwil; Vratislav Kvita, Muttenz, and Gerd Greber, Binningen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

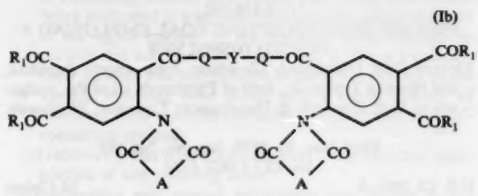
**Filed Dec. 6, 1976, Ser. No. 748,015**
**Claims priority, application Switzerland, Dec. 19, 1975, 16511/75**
**Int. Cl.[2] C08G *73/12***
**U.S. Cl. 204—159.22** **22 Claims**

1. A crosslinkable mixture, essentially unpolymerized and stable at temperatures up to about 100° C, consisting of at least one compound of the formula I*a* or I*b*

(Ia)



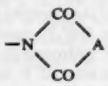
or



(Ib)



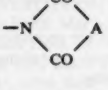
where in formula I*a* the



groups independently of each other are linked to the benzene rings in the 3- or 4- position; and a carbonyl of the —COQYQOC— moiety and a -COR group are attached in pairs to adjacent carbon atoms at the 1- and 2-positions of the benzene rings, whereby on each benzene ring one of said carbonyl and —COR groups can be in the 1-position and the other in the 2-position; or of a corresponding cyclised derivative, and of at least one diamine of the formula II

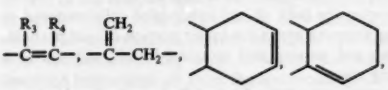
HQ-Z-QH (II);

whereby the molar ratio of the compound of the formula I*a* and/or I*b*, or of a corresponding cyclised derivative, to diamine of the formula II is between about 1.2: 1 to 50: 1, and wherein the X's independently of one another represent hydrogen or, if the radical



is in the 4-position of the benzene ring, also $—COR_2$, the R's and $R_2$'s independently of one another represent a hydroxyl group, phenoxy; phenoxy substituted by one or two nitro groups, by one alkyl of 1 to 2 carbon atoms, by one alkoxy of 1 to 2 carbon atoms or by two to five halogen atoms; alkoxy of 1 to 18 carbon atoms or an $O^-M^+$ group,

the $R_1$'s independently of one another represent a hydroxyl group, phenoxy; phenoxy substituted by one or two nitro groups, by one alkyl of 1 to 2 carbon atoms, by one or two alkoxy of 1 to 2 carbon atoms or by two to five halogen atoms; alkoxy of 1 to 18 carbon atoms or an $O^-M^+$ group, or two adjacent $R_1$'s together represent the —O— grouping, the A's independently of one another represent a radical of the formula



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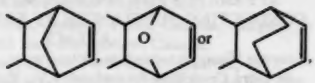
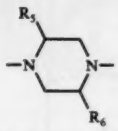


$R_3$ and $R_4$ independently of one another represent hydrogen, chlorine, bromine or methyl,

$M^+$ represents an alkali metal cation, a trialkylammonium cation having 3–24 carbon atoms, or a quaternary ammonium cation,

Y and Z independently of one another represent an aliphatic radical having at least two carbon atoms, a cycloaliphatic, carbocyclic-aromatic or heterocyclic-aromatic radical,

Q represents —NH—, or —Q—Y—Q— and/or —Q—Z—Q— represents the grouping



and

$R_5$ and $R_6$ independently of one another represent hydrogen, methyl or phenyl.

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**4,110,189**

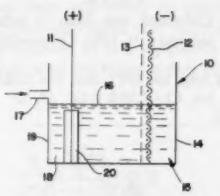
## ELECTRO-OSMOTIC/PHORETIC PROCESS FOR CONCENTRATING CLAY

**Albert C. Kunkle; William Floyd Abercrombie, Jr., and Charles John Akins, Jr., all of Macon, Ga., assignors to J. M. Huber Corporation, Locust, N.J.**

**Continuation of Ser. No. 541,031, Jan. 14, 1975, abandoned, which is a continuation-in-part of Ser. No. 397,508, Sep. 14, 1973, abandoned, which is a continuation-in-part of Ser. No. 263,382, Jun. 5, 1972, abandoned. This application Jun. 16, 1976, Ser. No. 696,578**

**Int. Cl.[2] B01D** *13/02*

**U.S. Cl. 204—180 R** **18 Claims**




1. A method of processing crude clay to obtain a refined clay filter cake of about 70% solids without spray drying comprising the sequential steps of

blunging and dispersing crude clay forming a slurry,

degritting, classifying and leaching the crude clay slurry flocculating said slurry and removing undesirable foreign materials to form a refined slurry,

filtering the refined slurry, and

simultaneously electro-phoretically separating suspended solid clay particles from the slurry and electroosmotically separating aqueous medium from the slurry to obtain a refined clay cake having a solids content in excess of about 70% solids.

## 4,110,190
## APPARATUS FOR MACHINING ELECTRICALLY CONDUCTING SUBSTANCES BY ELECTROCHEMICAL ATTACK

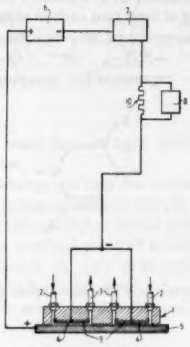
**Kommer Visser, Amsterdam-Bijlmermeer, Netherlands, assignor to Ultra Centrifuge Nederland N.V., The Hague, Netherlands**

**Division of Ser. No. 705,174, Jul. 14, 1976, Pat. No. 4,073,710. This application Dec. 7, 1977, Ser. No. 858,408**

**Claims priority, application Netherlands, Aug. 11, 1975, 7509529**

**Int. Cl.[2] B23P *1/02*; C25F *3/02, 3/14***

**U.S. Cl. 204—224 M** **2 Claims**



1. In an apparatus for removing material from an electrically conducting workpiece by electrochemical attack of the kind including an electrically insulating flow-guiding template having afflux channels in a surface of the template, said channels being in communication with at least one liquid inlet and at least one liquid outlet and said template surface being adapted to engage the surface of the workpiece, the improvement which comprises electrodes disposed in said channels and embedded in the template, means for connecting the electrodes to the negative pole of a direct current source via a series-connected pulse generator and resistor, a current integrator connected in parallel to the resistor, and means for connecting the positive pole of the direct current source to the workpiece.

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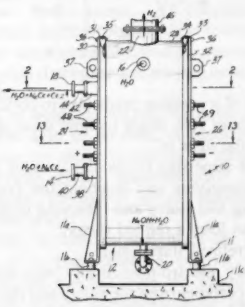
## 4,110,191
## SEPARATOR-ELECTRODE UNIT FOR ELECTROLYTIC CELLS

**Steven J. Specht, Cleveland, and John O. Adams, Englewood, both of Tenn., assignors to Olin Corporation, New Haven, Conn.**

**Filed Aug. 16, 1977, Ser. No. 824,999**

**Int. Cl.[2] C25B *9/00, 13/02***

**U.S. Cl. 204—266** **67 Claims**



1. A method of assembling a combination electrode separator unit for use in an electrolytic cell having a housing and interleaved parallel planar cathodes and anodes, which comprises the steps of:

(a) enveloping an electrode with a layer of separator material to create a first electrolyte chamber within said layer containing said electrode, and

(b) providing for passage of an electrical conductor, a supply fluid conduit and a product fluid conduit through said housing and layer into said created first electrolyte chamber.

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## 4,110,192
## PROCESS FOR LIQUEFYING COAL EMPLOYING A VENTED DISSOLVER

**Richard Emil Hildebrand, Glenshaw; John Angelo Paraskos, and Herman Taylor, Jr., both of Pittsburgh, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.**

**Filed Nov. 30, 1976, Ser. No. 746,181**

**Int. Cl.[2] C10G *1/04***

**U.S. Cl. 208—8** **14 Claims**

1. A process for liquefying coal at a hydrogen pressure above about 3,100 psi comprising passing a feed coal-solvent slurry and hydrogen through a tubular preheater zone to increase the temperature of the slurry to a maximum temperature from about 710° to about 800° F., passing effluent slurry from said preheater zone and hydrogen to a dissolver zone maintained at a temperature at least 10° F. higher than the maximum temperature in the preheater zone and in the range between about 750° and 900° F., the residence time in the dissolver zone being longer than in the preheater zone, venting a gaseous stream comprising carbon oxide gas, hydrogen and low boiling hydrocarbons from said dissolver zone, separately removing a liquid stream from said dissolver zone, and passing said removed liquid stream without a distillation step and hydrogen through a catalytic hydrogenation zone maintained at a temperature in the range 700° to 825° F.

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## 4,110,193
## PROCESS FOR PRODUCTION OF HYDROCARBONACEOUS FLUIDS FROM SOLIDS SUCH AS COAL AND OIL SHALE

**John E. Gwyn, Katy, and Scott C. Roberts, Houston, both of Tex., assignors to Shell Oil Company, Houston, Tex.**

**Continuation-in-part of Ser. No. 593,403, Jul. 7, 1975, abandoned. This application Mar. 11, 1977, Ser. No. 776,808**

**Int. Cl.[2] C10G *1/02***

**U.S. Cl. 208—11 R** **30 Claims**

1. A retorting process for recovery of hydrocarbonaceous fluids from solid material containing non-volatile carbonaceous materials comprising:

(a) countercurrently contacting said solid material subdivided to a particle size fluidizable in gas in the form of a relatively cool, upwardly moving fluidized mass in a vertically-oriented preheating zone with an inert relatively hot first particulate heat carrier thereby transferring sensible heat from the heat carrier to the subdivided solid material and heating said solid material to an elevated temperature below that required for retorting, said subdivided solid material being fluidized in gas in a manner to create a dilute-phase fluidized mass in the preheating zone and said particulate heat carrier being introduced in the upper portion of the preheating zone and having a particle size and density such that it falls through the dilute-phase fluidized mass at a substantially uniform rate and collects in the lower portion of the vertical preheating zone as a relatively cool first particulate heat carrier;

(b) recovering the bulk of said subdivided solid material at elevated temperature in the upper portion of said preheating zone and passing said recovered solid material to a retorting zone;

(c) recovering said relatively cool first particulate heat car-

rier in the lower portion of said preheating zone, and passing said recovered heat carrier to a heat recovery zone;

(d) introducing said subdivided solid material at elevated temperature into a vertically-oriented retorting zone as a dense phase, fluidized mass, and countercurrently contacting said fluidized mass in gas with a second inert particulate heat carrier heated to a temperature above that required for retorting to transfer sensible heat from the heat carrier to the subdivided solid material to obtain a vapor phase containing hydrocarbonaceous fluids and a solid particulate phase comprising a solid carbonaceous material-containing residue, said second particulate heat carrier being preheated in a separate heating zone and introduced in the upper portion of the retorting zone wherein its particle size and density are such that it falls at a substantially uniform rate and collects in the lower portion of the vertical retorting zone along with a minor amount of entrained solid material and solid carbonaceous material-containing residue;

(e) recovering said hydrocarbonaceous fluids from the upper portion of said retorting zone;

(f) separating said second particulate heat carrier in the lower portion of said retorting zone from solid carbonaceous material-containing residue and passing said separated heat carrier to a carrier heating zone wherein the carrier's temperature is raised to a level above that required for retorting, and returning said second particulate heat carrier after heating to the upper portion of the retorting zone;

(g) removing solid carbonaceous material-containing residue from the upper portion of the dense fluidized phase in the retorting zone and passing the residue to a heat recovery zone;

(h) introducing the solid carbonaceous material-containing residue from the retorting zone into a heat recovery zone, and countercurrently contacting said residue in gas with the relatively cool, first particulate heat carrier from the preheating zone to transfer sensible heat from the residue to the first particulate heat carrier and form a relatively hot first particulate heat carrier, and returning said relatively hot first particulate heat carrier to the preheating zone;

(i) recovering said relatively cool particulate residue from the heat recovery zone.

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**4,110,194**

## PROCESS AND APPARATUS FOR EXTRACTING BITUMINOUS OIL FROM TAR SANDS

**Glenn R. Peterson, Idaho Falls; Marvin C. Hicks, Shelley, and Peter W. Schwartz, Idaho Falls, all of Id., assignors to Intermountain Oil Research, Inc., Idaho Falls, Id.**

**Filed Apr. 16, 1976, Ser. No. 677,523**
**Int. Cl.² C10G *1/04***
**U.S. Cl. 208—11 LE** **15 Claims**

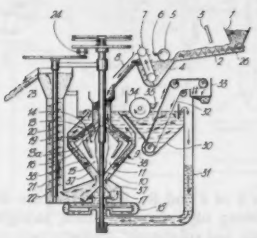
1. A process for treating tar sands to recover the bituminous oil therefrom, comprising intimately mixing tar sands with a hydrocarbon solvent which has a specific gravity less than that of water and is capable of dissolving the bituminous oil contained in the tar sands; continuing said mixing for a time sufficient for the solvent to extract said bituminous oil from the tar sands, thereby producing a slurry of solid particles suspended in a solution of bituminous oil dissolved in said hydrocarbon solvent; feeding the slurry into a body of water beneath the surface thereof; allowing the solid particles in the slurry to settle to the bottom of the body of water and said solvent solution and dissolved bituminous oil to rise to the surface of the body of water to form a separate liquid phase above the surface of the body of water; removing water-wet solid particles from the bottom of the body of water; removing said solution of hydrocarbon solvent and dissolved bituminous oil from the surface of the body of water; and recovering the dissolved bituminous oil from the hydrocarbon solvent.

**4,110,195**

## APPARATUS AND PROCESS FOR EXTRACTING OIL OR BITUMEN FROM TAR SANDS

**Dukecal Jenner Harding, Jackson Point, Canada, assignor to Magna International Inc., Downsview, Canada**

**Continuation-in-part of Ser. No. 542,985, Jan. 22, 1975, abandoned. This application May 31, 1977, Ser. No. 802,099**
**Claims priority, application United Kingdom, Jan. 24, 1974, 3395/74; Canada, Mar. 11, 1974, 194555**
**Int. Cl.² C10G *1/04***
**U.S. Cl. 208—11 LE** **42 Claims**



1. A method for the separation of bitumen from tar sands comprising the steps of:

mixing the tar sands with water to make a slurry, agitating this slurry and diluting the slurry with water to form a pulp having a water content at least equal in weight to the weight of tar sand and having a temperature in the range of about 35° to 120° F.,

moving said pulp primarily horizontally around an annular separating zone at a controlled speed which is low enough to allow gravity settling of bitumen free sand particles within said zone to form a rotationally static sand bed in contact with said horizontally moving pulp, the speed being high enough, having regard to any flow of back wash water, to prevent permanent settling of bitumen coated sand particles,

withdrawing sand from the bottom of said separating zone at a rate suitable for maintaining said bed of sand within said zone so that bitumen coated sand particles can be freed from bitumen by tumbling along the upper surface of said bed,

removing water containing fines and bitumen from an upper portion of said separating zone,

separating bitumen from the water, and

separating fines from said water to provide substantially bitumen-and-fines-free-water said bitumen-and-fines-free-water being returned to said separating zone while said fines are mixed with the bitumen free sand.

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**4,110,196**

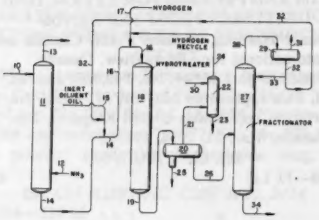
## CONVERSION OF SULFONIC ACIDS INTO A HYDROCARBON OIL OF SUPERIOR OXIDATION STABILITY

**David S. Bosniack, and Paul F. Korbach, both of Baytown, Tex., assignors to Exxon Research & Engineering Co., Linden, N.J.**

**Filed Dec. 10, 1976, Ser. No. 749,595**
**Int. Cl.² C10G *23/00***
**U.S. Cl. 208—13** **8 Claims**

1. A process for converting a sulfonic acid or a mixture of sulfonic acids into a hydrocarbon oil of superior oxidation stability comprising:

(a) forming sulfonates by reacting said sulfonic acid or mixture of acids with a nitrogen-containing compound of the formula




$$R_1-N:[HOH]_x \quad (R_2,\ R_3)$$

wherein $x$ is 0 or 1 and $R_1$, $R_2$, and $R_3$ are selected from the group consisting of hydrogen atoms, straight and branched chain aliphatic and substituted aliphatic radicals having from 1 to about 16 carbon atoms, cycloaliphatic radicals having from 3 to about 10 carbon atoms, and aryl radicals having from 6 to about 12 carbon atoms;

(b) reacting said sulfonates with hydrogen in the presence of a hydrotreating catalyst to cleave the carbon-sulfur bonds of said sulfonates; and

(c) recovering a hydrocarbon oil of superior oxidation stability from the reaction products of step (b).

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**4,110,197**

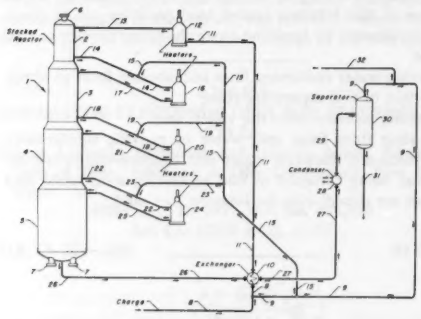
## HYDROCARBON CONVERSION WITH GRAVITY-FLOWING CATALYST PARTICLES

**Joel G. Herning, and James B. Shelton, both of Des Plaines, Ill., assignors to UOP Inc., Des Plaines, Ill.**

**Continuation-in-part of Ser. No. 650,471, Jan. 19, 1976, abandoned. This application May 12, 1977, Ser. No. 796,276**

**Int. Cl.**[2] **C10G** *23/08, 35/12*

**U.S. Cl. 208—64** **10 Claims**




1. In a multiple-stage catalytic conversion system, wherein (1) heated hydrocarbonaceous charge stock and hydrogen flow serially through a plurality of catalytic reaction zones; (2) the reaction product effluent from each zone is heated prior to the introduction thereof into the next succeeding reaction zone; (3) catalyst particles move as an annular bed through each reaction zone via gravity-flow; and, (4) catalyst distribution, by volume increases in the direction of charge stock flow through said reaction zones, the method of converting said charge stock which comprises the steps of:

(a) heating said charge stock and hydrogen and introducing the heated mixture into a first reaction zone maintained at hydrocarbon conversion conditions;

(b) heating the resulting first reaction zone effluent in admixture with added hydrogen and introducing the total heated mixture into a succeeding reaction zone containing a greater amount of catalyst volume than said first reaction zone maintained at hydrocarbon conversion conditions;

(c) separating the effluent from the last reaction zone in said plurality to provide (i) a normally liquid product stream and, (ii) a hydrogen-rich vaporous phase;

(d) admixing a first portion of said hydrogen-rich phase with said charge stock prior to heating, and admixing a second portion of said hydrogen-rich phase with said first reaction zone effluent prior to heating, the ratio of said first and second portions of said hydrogen-rich phase selected to provide (i) decreasing vapor density, and, (ii) increasing lateral pressure drop, in the direction of charge stock flow through said reaction zones;

(e) at least periodically withdrawing catalyst particles from one of said reaction zones; and,

(f) at least periodically introducing fresh, or regenerated catalyst particles into another of said reaction zones.

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**4,110,198**

## PROCESS FOR HYDROCRACKING HYDROCARBONS

**John C. Hayes, Palatine, and Ernest L. Pollitzer, Skokie, both of Ill., assignors to UOP Inc., Des Plaines, Ill.**

**Division of Ser. No. 765,177, Feb. 3, 1977, Pat. No. 4,079,092, which is a continuation-in-part of Ser. No. 687,135, May 17, 1976, Pat. No. 4,018,669, which is a continuation-in-part of Ser. No. 522,209, Nov. 8, 1974, Pat. No. 3,960,710. This application Oct. 31, 1977, Ser. No. 846,856**

**Int. Cl.**[2] **C10G** *13/04;* **B01J** *27/06, 29/12*

**U.S. Cl. 208—111** **10 Claims**

1. A process for hydrocracking a hydrocarbonaceous charge stock into lower molecular weight hydrocarbons, which process comprises reacting said charge stock with hydrogen at hydrocracking conditions, and in contact with a catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum or palladium, about 0.01 to about 2 wt. % rhodium, about 0.05 to about 5 wt. % cobalt and about 0.1 to about 3.5 wt. % halogen; wherein the platinum or palladium, rhodium, and catalytically available cobalt are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum or palladium and rhodium are present in the elemental metallic state; and wherein substantially all of the catalytically available cobalt is present in the elemental metallic state or in a state which is reducible to the elemental metallic state under hydrocarbon conversion conditions or in a mixture of these states, and separating the resulting reaction zone effluent to recover said lower molecular weight hydrocarbons.

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**4,110,199**

## HYDROCARBON CONVERSION WITH AN ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

**John F. Flagg, Rosemont, and George J. Antos, Arlington Heights, both of Ill., assignors to UDP Inc., Des Plaines, Ill.**

**Filed Jan. 10, 1977, Ser. No. 758,285**

**Int. Cl.**[2] **C10G** *35/08*

**U.S. Cl. 208—139** **20 Claims**

1. In a process for converting a hydrocarbon which comprises contacting said hydrocarbon in a substantially water-free environment at hydrocarbon conversion conditions with an acidic catalytic component comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.05 to about 5 wt. % cobalt, and about 0.1 to about 3.5 wt. % halogen; wherein the platinum group metal and catalytically available cobalt are uniformly dispersed throughout said porous carrier material; wherein substantially all of said platinum group metal is present in the elemental metallic state; and wherein substantially all of the catalytically available cobalt is present in the elemental state or in a state which is reducible to the elemental metallic

state under said hydrocarbon conversion conditions, or in a mixture of these states, the improvement which comprises the addition to the composite of about 0.1 to about 10 wt. % uranium uniformly throughout said composite wherein substantially all of said uranium is present in an oxidation state above that of the elemental metal.

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## 4,110,200
## HYDROCARBON CONVERSION WITH AN ACIDIC SULFUR-FREE MULTIMETALLIC CATALYTIC COMPOSITE

George J. Antos, Arlington Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 713,020, Aug. 9, 1976, Pat. No. 4,036,742, which is a continuation-in-part of Ser. No. 656,925, Feb. 10, 1976, Pat. No. 4,025,418, which is a continuation-in-part of Ser. No. 550,083, Feb. 14, 1975, Pat. No. 3,939,059. This application Jun. 27, 1977, Ser. No. 810,321
The portion of the term of this patent subsequent to Feb. 17, 1993, has been disclaimed.
Int. Cl.[2] C01G *35/08*
U.S. Cl. 208—139 24 Claims

1. A process for converting a hydrocarbon which comprises contacting the hydrocarbon at hydrocarbon conversion condition with an acidic sulfur-free catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.1 to about 5 wt. % cobalt, about 0.01 to about 2 wt. % rhenium, about 0.01 to about 5 wt. % indium and about 0.1 to about 3.5 wt. % halogen; wherein the platinum group metal, catalytically available cobalt, rhenium and indium are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum group metal is present in the elemental metallic state; wherein substantially all of the indium is present in an oxidation state above that of the elemental metal; and wherein substantially all of the rhenium and catalytically available cobalt are present in the elemental metallic state or in a state which is reducible to the elemental metallic state under hydrocarbon conversion conditions or in a mixture of these states.

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## 4,110,201
## HYDROCARBON CONVERSION WITH AN ACIDIC SULFUR-FREE MULTIMETALLIC CATALYTIC COMPOSITE

George J. Antos, Arlington Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.

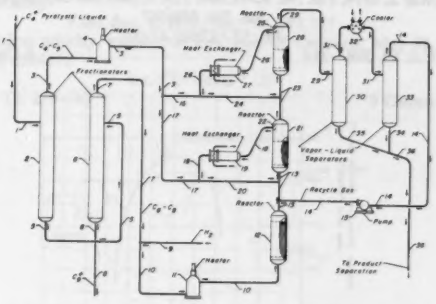
Division of Ser. No. 621,718, Oct. 14, 1975, abandoned. This application Apr. 11, 1977, Ser. No. 786,744
Int. Cl.[2] C10G *35/08*
U.S. Cl. 208—139 18 Claims

1. In a process for converting a hydrocarbon which comprises contacting said hydrocarbon in a substantially water-free environment at hydrocarbon conversion conditions with an acidic substantially sulfur-free catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt.% platinum group metal, about 0.05 to about 5 wt.% cobalt, and about 0.1 to about 3.5 wt.% halogen; wherein the platinum group metal and catalytically available cobalt are uniformly dispersed throughout said porous carrier material; wherein substantially all of said platinum group metal is present in the elemental state; and wherein substantially all of the catalytically available cobalt is present in the elemental state or in a state which is reducible to the elemental state under said hydrocarbon conversion conditions, or in a mixture of these states, the improvement which comprises the addition to the composite of about 0.01 to about 5 wt.% cadmium uniformly throughout said porous carrier material.

## 4,110,202
## HYDROGENATION PROCESS FOR PYROLYSIS LIQUIDS

George R. Winter, III, Mt. Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Nov. 18, 1977, Ser. No. 852,653
Int. Cl.[2] C10G *23/00*
U.S. Cl. 208—144 6 Claims




1. A hydroconversion process which comprises the steps of:
(a) fractionating a feed stream which comprises $C_5$ diolefins and other olefinic hydrocarbons having between 4 and 8 carbon atoms per molecule to form a light fraction comprising hydrocarbons having 4 and 5 carbon atoms per molecule and a heavy fraction comprising hydrocarbons having 6 to 8 carbon atoms per molecule;
(b) admixing said heavy fraction with a stream comprising hydrogen at the rate of from 500 to 5000 SCFB and contacting the mixed-phase admixture with a first bed of catalyst by passage through a first reaction zone maintained at hydrogenation-promoting conditions and forming a first catalyst bed effluent stream;
(c) admixing a first portion of said light fraction with: (1) a hereinafter described first recycle liquid stream; (2) said first catalyst bed effluent stream and (3) a recycle gas stream comprising hydrogen and thereby forming a mixed-phase first reactant stream;
(d) contacting said first reactant stream from step (c) with a second bed of catalyst by passage through a second reaction zone maintained at hydrogenation-promoting conditions and forming a second catalyst bed effluent stream;
(e) admixing a liquid-phase first portion of said second catalyst bed effluent stream from step (d) with said first portion of said light fraction of step (c) as the previously specified first recycle liquid stream of step (c);
(f) admixing a mixed-phase second portion of said second catalyst bed effluent stream, which includes hydrogen, from step (d) with: (1) a second portion of said light fraction; and (2) a hereinafter described second recycle liquid stream and thereby forming a mixed-phase second reactant stream;
(g) contacting said second reactant stream from step (f) with a third bed of catalyst by passage through a third reaction zone maintained at hydrogenation-promoting conditions and forming a third catalyst bed effluent stream;
(h) admixing a liquid-phase first portion of said third catalyst bed effluent stream from step (g) with said second portion of said light fraction of step (f) as the previously specified second recycle liquid stream of step (f); and,
(i) separating a mixed-phase second portion of said third catalyst bed effluent stream from step (g) into a liquid-phase product and a vapor stream, and recycling at least a portion of said vapor stream as said recycle gas stream in step (c).

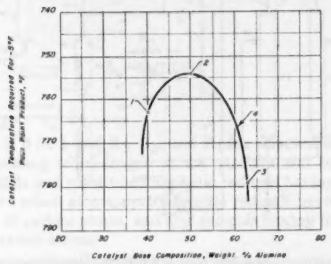
## 4,110,203
## DESULFURIZATION PROCESS OF A HYDROCARBON DISTILLATE CONTAINING MONO-OLEFINS AND AROMATICS

Lee Hilfman, Mt. Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 716,922, Aug. 23, 1976, Pat. No. 4,061,563, which is a division of Ser. No. 599,561, Jul. 28, 1975, Pat. No. 4,003,956, which is a continuation-in-part of Ser. No. 466,759, May 3, 1974, Pat. No. 3,931,048. This application Sep. 30, 1977, Ser. No. 838,267

Int. Cl.[2] C10G *23/02*

U.S. Cl. 208—216 5 Claims




1. A process for desulfurizing a sulfurous hydrocarbon distillate containing mono-olefinic hydrocarbons and aromatics, which process comprises reacting said distillate with hydrogen in contact with a catalytic composite comprising a combination of a nickel component and a tungsten component with a silica-alumina carrier material wherein said carrier material is co-gelled silica-alumina consisting of from about 43 percent to about 57 percent by weight alumina and from about 57 to about 43 percent by weight silica and wherein said components are present in amounts sufficient to result in the composite containing, on an elemental basis, about 2 to about 10 percent by weight of the nickel component and about 8 to about 20 percent by weight of the tungsten component.

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## 4,110,204
## PROCESS FOR REMOVING POLONIUM FROM NATURAL GAS CONDENSATES CONTAINING THE SAME

Thomas Henry Farmer, Hatfield, England, assignor to Carless, Capel & Leonard Limited, London, England

Filed Feb. 28, 1977, Ser. No. 772,958

Claims priority, application United Kingdom, Mar. 2, 1976, 8347/76

Int. Cl.[2] C10G *25/02*

U.S. Cl. 208—251 R 8 Claims

1. A process for removing polonium from natural gas condensates which process comprises contacting fluid polonium containing natural gas condensates with an ion exchange resin having a dry surface area of at least 1 $m^2/g$ and containing exchange groups selected from the group consisting of acidic and strongly basic exchange groups.

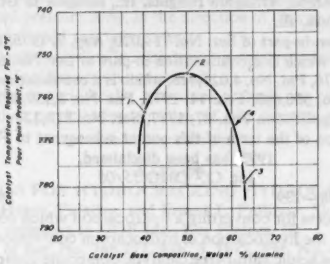
## 4,110,205
## PROCESS FOR HYDROGENATING A COKE-FORMING HYDROCARBON DISTILLATE

Lee Hilfman, Mt. Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 716,922, Aug. 23, 1976, Pat. No. 4,061,563, which is a division of Ser. No. 599,561, Jul. 28, 1975, Pat. No. 4,003,956, which is a continuation-in-part of Ser. No. 466,759, May 3, 1974, Pat. No. 3,931,048. This application Sep. 30, 1977, Ser. No. 838,272

Int. Cl.[2] C10G *23/02*

U.S. Cl. 208—255 5 Claims




1. A process for hydrogenating a coke-forming hydrocarbon distillate containing conjugated di-olefinic and mono-olefinic hydrocarbons, and aromatics, which process comprises reacting said distillate with hydrogen at a temperature below about 500° F. in contact with a catalytic composite comprising a combination of a nickel component, and a tungsten component with a silica-alumina carrier material wherein said carrier material is co-gelled silica-alumina consisting of from about 43 percent to about 57 percent by weight alumina and from about 57 to about 43 percent by weight silica and wherein said components are present in amounts sufficient to result in the composite containing, on an elemental basis, about 2 to about 10 percent by weight of the nickel component and about 8 to about 20 percent by weight of the tungsten component and an alkali metal component, and recovering an aromatic/mono-olefinic hydrocarbon concentrate substantially free from conjugated di-olefinic hydrocarbons.

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## 4,110,206
## METAL SEPARATING PROCESS AND APPARATUS

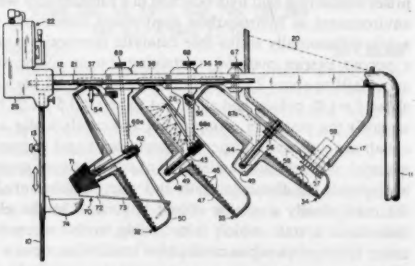
Jonny Hilmer Kleven, 1325 N. Fairview, Burbank, Calif. 91505

Continuation-in-part of Ser. No. 613,366, Sep. 15, 1975, Pat. No. 4,008,152. This application Feb. 3, 1977, Ser. No. 765,268

The portion of the term of this patent subsequent to Feb. 15, 1994, has been disclaimed.

Int. Cl.[2] B03B *5/74;* C22B *11/12*

U.S. Cl. 209—43 14 Claims



1. An apparatus for separating metals in the free state from ore which comprises:

(a) a plurality of from two to six downwardly inclined, serially mounted, flat, pan-shaped separating wheels including a common shaft means for driving said wheels, each wheel providing (i) a peripheral retaining rim; (ii) a central annulus, and (iii) a plurality of spiral grooves disposed on the upper surface of each wheel and directed from the wheel periphery upwardly and inwardly to the annulus, each of said wheels being concentrically rotatable about its central annulus;

(b) means to form a water slurry with the ore on each wheel; and

(c) a funnel positioned around the annulus of each wheel for forwarding upgraded ore along the spiral grooves from the annulus to a succeeding wheel.

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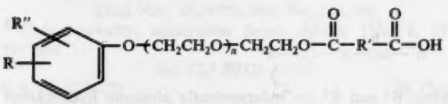
## 4,110,207

## PROCESS FOR FLOTATION OF NON-SULFIDE ORES

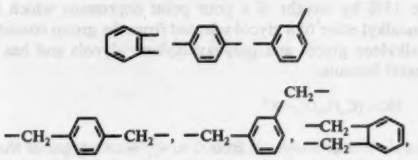
**Samuel Shan Ning Wang, Cheshire, and Eugene Leroy Smith, Jr., Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.**

**Filed Jan. 5, 1976, Ser. No. 646,450**
**Int. Cl.² B03D *1/02***
**U.S. Cl. 209—166** **5 Claims**

1. A process for recovering non-sulfide minerals which comprises classifying the mineral to provide particles of flotation size, slurrying the sized mineral in aqueous medium, conditioning the slurry with effective amounts of fuel oil, alkali, and a partial ester of a polycarboxylic acid having at least one free carboxylic acid group, and floating the desired mineral values by froth flotation, said partial ester having the structure



wherein R is an alkyl group of about 8 to 12 carbon atoms, R″ is hydrogen or an alkyl group of up to about 12 carbon atoms, $n$ is a number 0–3, and R′ is a bivalent grouping selected from $—(CH_2)_m—$ wherein $m$ is an integer of 1–6, —CH=CH—, —CHOHCH₂—, —CHOHCHOH—, —CH₂C(OH)(COOH)CH₂—,



and cyclohexyl.

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## 4,110,208

## CLARIFICATION PROCESS

**John A. Neal, Bellingham, Wash., assignor to Georgia-Pacific Corporation, Portland, Oreg.**

**Division of Ser. No. 634,832, Nov. 24, 1975. This application Jun. 24, 1977, Ser. No. 809,640**
**Int. Cl.² C02B *1/20***
**U.S. Cl. 210—425** **8 Claims**

1. A flocculating agent for flocculation of finely dispersed particles in an aqueous medium comprising mixture of a water-soluble salt of aluminum, or iron, or mixture thereof with a ferromagnetic organic composition selected from the group consisting essentially of ferromagnetic lignosulfonate, ferromagnetic sulfonated tannin, and ferromagnetic sulfonated phenol condensed with an aldehyde, said ferromagnetic organic composition being present in the mixture in an amount such that the metal content of the ferromagnetic organic composition is in the range of from 0.5 to 20% of the metal content of the water-soluble salt.

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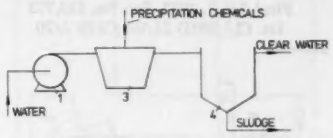
## 4,110,209

## METHOD FOR TREATING A MEDIUM CONTAINING WATER WITH COAGULANTS

**Walter vogel, Max-Plank-strasse 7a, D-6700 Waldsee, Germany, Assignor to Egon Cherdron, Limburgerhof; Otto Helmooldt, Ludwigshafen am Rhein and Walter Vogel, Waldsee, all of Germany**

**Filed Jun. 1, 1976, Ser. No. 691,717**
**Claims priority, application Fed. Rep. of Germany, May 31, 1975, 2524172**
**Int. Cl.² C02B *1/20***
**U.S. Cl. 210—44** **5 Claims**




1. A method for increasing the chemical efficiency of a precipitating agent having a metal base in the treatment of a medium containing water, comprising: initially conducting, by pressure the medium to be treated into a mixing cell and mixing it in the mixing cell in free turbulence with a precipitant solution containing the precipitating agent to form a reaction mixture containing flocs, conducting the reaction mixture into a separating basin and removing the flocs from clear water in the separating basin.

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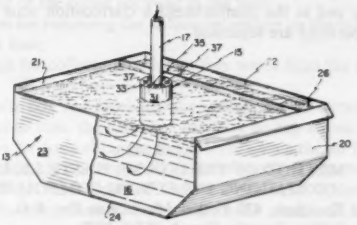
## 4,110,210

## DISPERSED GAS FLOTATION PROCESS

**Vernon R. Degner, Citrus Heights, and William V. Colbert, Lodi, both of Calif., assignors to Envirotech Corporation, Menlo Park, Calif.**

**Continuation of Ser. No. 583,072, Jun. 2, 1975, abandoned. This application Apr. 26, 1977, Ser. No. 791,102**
**Int. Cl.² B03D *1/02, 1/24***
**U.S. Cl. 210—44** **24 Claims**




1. A dispersed gas flotation process wherein hydraulic effects are used to disperse gas bubbles throughout a contained liquid body with a free surface, said process comprising: pumping a two-phase fluid into the liquid body through an ejection device with the density and the kinetic energy rate of the ejected fluid per unit volume of the contained body at the point of ejection being defined by a point on the graph of FIG. 2 within the area encompassed by Region I.

18. A dispersed gas flotation process wherein hydraulic effects are used to disperse gas bubbles throughout a contained liquid body with a free surface, said process comprising: pumping a two-phase fluid into the liquid body through an ejection device with the density and the kinetic energy rate at the point of ejection of the ejected fluid per unit volume of the contained

body being defined by any point on the graph of FIG. 2 within the area encompassed by Region I and maintaining the density and kinetic energy rate within said Region I, thereby to achieve a relatively quiet but frothy surface on the liquid body and to fill the liquid body with gas bubbles.

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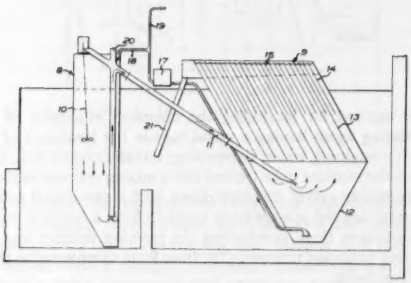
**4,110,211**

## PROCESS FOR THE PREPARATION OF A SUBSTANTIALLY HOMOGENEOUS LIME WATER SOLUTION

**Stig Arvid Henrikson, 103 Grönviksvagen S-161, 40 Bromma, Sweden**

**Filed Jul. 7, 1977, Ser. No. 813,773**
**Int. Cl.² B01D *21/02*; C02B *1/20***
**U.S. Cl. 210—47** **5 Claims**



1. A process for the preparation of a substantially homogeneous lime water solution intended for use in the purification of waste water and like liquids, the starting material for the homogeneous lime water solution consisting of a lime suspension, comprising introducing the lime suspension at the bottom of a compartment in which it is caused to rise in order to leave at the top thereof, said lime suspension during its upward flow being caused to pass lamellas which create a sludge zone at their lower end in the compartment, in which zone the rising lime suspension is filtered, while said lamellas create at their upper end in the compartment a clarification zone in which fine particles are separated.

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**4,110,212**

## METHOD OF TREATING A WASTE LIQUID CONTAINING POLLUTING COMPOUNDS

**David Krofchak, 470 Collier MacMillan Dr., P.O. Box 1060, Cambridge, Ontario, Canada (N1R 5Y7)**

**Filed Apr. 21, 1977, Ser. No. 789,750**
**Int. Cl.² C02B *1/20*; C02C *5/02***
**U.S. Cl. 210—53** **8 Claims**

1. A method of treating a waste liquid containing polluting compounds, including reacting the waste liquid with an acidic ferrous salt solution to adjust the pH of the liquid to a value within the range of from about 2 to about 5 and to reduce polluting compounds in the waste liquid to a form capable of reacting with an alkali to produce a precipitate, reacting the adjusted waste liquid with an alkali to raise the pH of the liquid to a value within the range of from about 9 to about 12.5 and to produce said precipitate, and reacting the alkaline waste liquid with a silicic compound to form large complex silicate molecules with the precipitate and consequent solidification of the waste liquid into a stable, non-polluting solid.

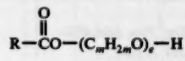
**4,110,213**

## COMPOSITIONS AND PROCESSES FOR THE DISPERSING OF OIL SPILLAGES

**David John Tennant; Geoffrey Philip Sheridan, both of Manchester, and Alistair James Steel, Stockport, all of England, assignors to Lankro Chemicals Group Limited, Manchester, England**

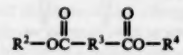
**Filed Nov. 8, 1976, Ser. No. 739,993**
**Claims priority, application United Kingdom, Nov. 7, 1975, 46255/75**
**Int. Cl.² B01D *17/02*; C02B *1/18*; B01F *17/36***
**U.S. Cl. 210—59** **27 Claims**

1. A concentrate for use in the dispersion of oil spillages, which concentrate is substantially free from hydrocarbon solvent and consists of:- from 20 to 75% by weight of an emulsifying agent, which is a mono-ester of an aliphatic carboxylic acid and a polyoxyalkylene glycol and has the general formula



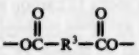
I

wherein R is the aliphatic hydrocarbyl radical of a fatty acid containing from 10 to 22 carbon atoms, *m* is an integer from 2 to 4, there being at least one ($C_2H_4O$) group per molecule, and *e* is an integer of at least 2; from 77 to 15% by weight of a solvent which is a diester of an acid selected from the group consisting of aryl and alkyl dicarboxylic acids, with at least one monohydric aliphatic alcohol, and has the general formula

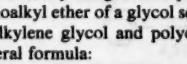


II

wherein $R^2$ and $R^4$ are independently aliphatic hydrocarbyl radicals containing from 5 to 13 carbon atoms, and



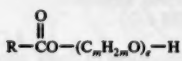
is the diacyloxy radical of an acid selected from the group consisting of aromatic and aliphatic carboxylic acids and from 3 to 15% by weight of a pour point depressant which is a monoalkyl ether of a glycol selected from the group consisting of alkylene glycol and polyoxyalkylene glycols and has the general formula:



III

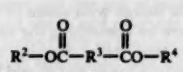
wherein *n* is an integer of from 2 to 4, *f* is an integer of from 1 to 5, and $R^5$ is an alkyl radical containing from 1 to 6 carbon atoms.

13. A process for the dispersal of an oil spillage, which process comprises diluting a concentrate composition which is substantially free from hydrocarbon solvent and consists of:- from 20 to 75% by weight of an emulsifying agent, which is a mono-ester of an aliphatic carboxylic acid and a polyoxy-alkylene glycol and has the general formula



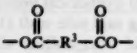
I

wherein R is the aliphatic hydrocarbyl radical of a fatty acid containing from 10 to 22 carbon atoms, *m* is an integer from 2 to 4, there being at least one ($C_2H_4O$) group per molecule, and *e* is an integer of at least 2; from 77 to 15% by weight of a solvent which is a diester of an acid selected from the group consisting of aryl and alkyl dicarboxylic acids, with at least one monohydric aliphatic alcohol, and has the general formula

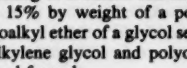


II

wherein $R^2$ and $R^4$ are independently aliphatic hydrocarbyl radicals containing from 5 to 13 carbon atoms, and



is the diacyloxy radical of an acid selected from the group consisting or aromatic and aliphatic carboxylic acids and from 3 to 15% by weight of a pour point depressant which is a monoalkyl ether of a glycol selected from the group consisting of alkylene glycol and polyoxyalkylene glycols and has the general formula



III

wherein $n$ is an integer of from 2 to 4, $f$ is an integer of from 1 to 5, and $R^5$ is an alkyl radical containing from 1 to 6 carbon atoms, with water, and applying the diluted concentrate to, and mixing the diluted concentrate with the oil spillage.

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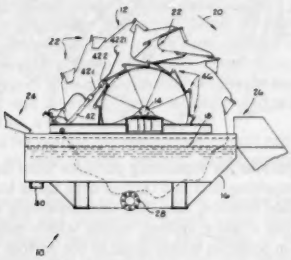
**4,110,214**

## DRAINAGE DEVICE FOR PARTICULATE MATERIAL

**Johann Baptist Pfeffer, Johannesburg, South Africa, assignor to S.A. Block & Concrete (Proprietary) Limited, Alberton, South Africa**

**Filed Nov. 29, 1976, Ser. No. 745,768**
**Claims priority, application South Africa, Dec. 1, 1975, 75/7534**
**Int. Cl.² B01D *33/00***
**U.S. Cl. 210—77** **10 Claims**



1. A drainage device for scooping liquids and solids in suspension and separating the solids from the liquid by drainage of the liquid comprising

a bucket wheel having a plurality of foraminous buckets through which the liquid can drain, spaced circumferentially about its axis;

drive means to rotate said bucket wheel in a plurality of successive arcuate steps with high torque moments applied cyclically in succession on said bucket wheel at positions about and radially spaced from its axis, said drive means including

a pair of axially spaced plunger and cylinder assemblies, each having a head arranged to engage cyclically on working strokes by means of up thrust high torque moments with mating formations which are fast with said bucket wheel and spaced circumferentially about the axis of said bucket wheel,

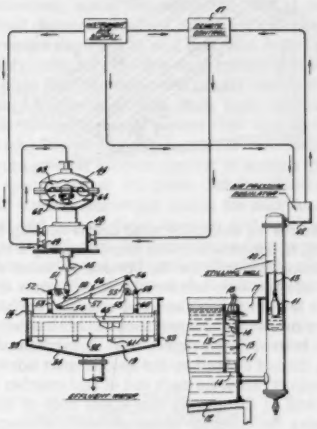
and means to thrust each plunger of said plunger and cylinder assembly on its working stroke, interconnected with the operation of the other of said plunger and cylinder assemblies in alternate successive movements of said plungers.

**4,110,215**

## LIQUID LEVEL CONTROL SYSTEM FOR SEPARATION TANK

**David A. Bramlett, Tulsa, Okla., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.**

**Filed Mar. 22, 1976, Ser. No. 668,871**
**Int. Cl.² B01D *33/38***
**U.S. Cl. 210—114** **9 Claims**



1. In a separation tank for separating pollutants from influent water and having:

(a) an inlet for the influent water to flow into the tank;

(b) means for removing the pollutants floating to the upper surface of the liquid enclosed in the tank;

(c) means for removing the pollutants settling on the bottom of the tank;

(d) means for collecting pollutant free water from the tank; and

(e) a weir box for receiving the pollutant free water for discharge from the tank, the weir box having a weir gate system for controlling the liquid level within the air flotation tank; an automatic liquid level control system for operating the weir gate so that the liquid level within the tank is maintained at a predetermined level, said level control system comprising:

(f) a stilling well located on the sidewall of the tank so that the liquid level within the stilling well is the same as that in the tank;

(g) means for sensing the liquid level within the stilling well;

(h) means, responsive to the sensing means, for producing an output air pressure signal with the pressure related to the liquid level within the stilling well;

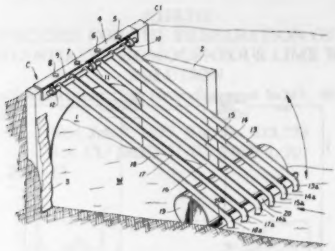
(i) means for producing a linear displacement related to the air pressure produced by the air pressure producing means; and

(j) means for linking the weir gate to the means for producing a linear displacement so that the weir gate is moved to vary the flow of water from the tank in response to the liquid level changing in the tank, for maintaining a predetermined liquid level within the tank.

## 4,110,216
## APPARATUS FOR COLLECTING DEBRIS FLOATING IN A STREAM

Albert Lloyd Wagnon, 2167 Capehart Pl. NE., Atlanta, Ga. 30345, and Alexandros James Janoulis, 1957 Kilburn Dr., Atlanta, Ga. 30324

Filed Apr. 22, 1976, Ser. No. 679,168
Int. Cl.[2] B01D *33/22*
U.S. Cl. 210—156 4 Claims

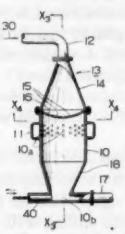


1. Apparatus for collecting solid debris floating in a stream comprising, in combination, a stream defined by a bottom with banks defining sidewalls for the bottom, collector means consisting of elongate bars horizontally spaced apart in the direction of the width of the stream and arranged vertically above the bottom thereof, an elongate member horizontally arranged above the bottom of the stream with its axis extending across the width thereof defined by the spaced apart sidewalls of the stream, support means for each end of said member located on each sidewall of the stream, first upper ends of the elongate bars defining the collector means pivotally connected to said horizontal member for pivotal movement around the longitudinal axis of said member, second lower ends of the elongate bars connected by float means with a planar surface extending in the direction of the width of the collector surface, said direction being at right angles to the longitudinal axis of said elongate bars whereby the velocity of water flowing against the planar surface of said float means raises the second lower end of the collector means for pivotal movement around said horizontal member.

## 4,110,217
## CONTINUOUS SEWAGE SLUDGE HEAT TREATMENT APPARATUS

Gichi Nakamura, 21-9, Gamo 4-chome, Jotoku, Osaka, Japan

Filed Apr. 11, 1977, Ser. No. 786,467
Int. Cl.[2] F26B *17/12*
U.S. Cl. 210—175 3 Claims

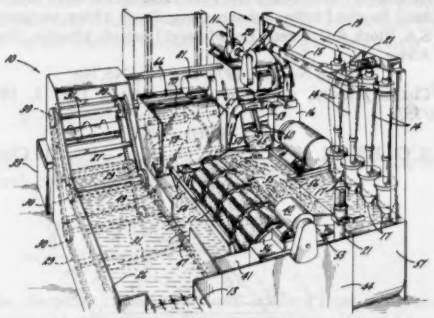


1. In an apparatus for the heat treatment of a sludge mass delivered from a final settling tank of a sewage disposal system having a feed pipe (12), a discharge pipe (17), a vertical cylindrical vessel (19) with a side wall (10), a substantially vertical conical head portion (14) connected to the upper edge of said vertical cylindrical vessel, said head portion having an upper end connected to said feed pipe (12), the improvement in said apparatus to continuously treat the sludge with steam of relatively low pressure and temperature by converting the sludge mass into thin strings of sludge, and steam treating these strings, said improvement comprising: a lower end to said head portion (14) and a round member thereat with a plurality of axial pores (15) through which the sludge mass must pass and be converted into individual vertical strings of sludge axially disposed in said vertical cylindrical vessel (19), a steam feeding jacket (11) surrounding said side wall (10) with a plurality of radial apertures in said side wall to allow steam from said jacket to enter into said cylindrical vessel (19) and heat the vertical sludge strings therein; a conical tail portion connected to the lower end of said cylindrical vessel with its lower end in substantial opposite relationship to said head portion to receive the treated sludge-steam mixture, said lower end being coupled to said discharge pipe (17) and means to facilitate discharge of said treated sludge.

## 4,110,218
## LIQUID CLEANING APPARATUS HAVING CYCLONIC SEPARATORS

Roger Marriott, and Mark R. Estabrook, both of Rockford, Ill., assignors to Barnes Drill Co., Rockford, Ill.

Filed Feb. 7, 1977, Ser. No. 766,012
Int. Cl.[2] B01D *35/06;* B03C *1/02, 1/30*
U.S. Cl. 210—223 5 Claims



1. Apparatus for separating particles from liquid, said apparatus comprising first and second drag tanks located in spaced side-by-side relation, said first tank receiving a flow of dirty liquid from a using system, means within said first tank for picking up particles which settle to the bottom of the first tank and for discharging such particles out of one end of the first tank to a collection area at one end of said apparatus, a rotary magnetic separator located between said tanks, means defining a flow path from said first tank, thence beneath said separator and thence toward said one end of said apparatus whereby liquid in said first tank flows beneath and is partially cleaned by said separator by virtue of particles in such liquid being picked up by said separator, a reservoir for partially cleaned liquid located adjacent said one end of said apparatus and receiving the liquid cleaned by said separator and discharged from said flow path, means for scraping off the particles on said separator and for discharging said particles into said second tank, a cyclonic separator operable to receive a flow of partially cleaned liquid and to produce a flow of cleaner liquid and a dirty underflow, means for pumping partially cleaned liquid from said reservoir to said cyclonic separator, means for returning to said reservoir part of the liquid cleaned by said cyclonic separator and for delivering another part of such liquid to said using system, the underflow from said cyclonic separator being discharged into said second drag tank, means within said second tank for picking up particles which settle to the bottom of said second tank and for discharging such particles to said collection area at said one end of said apparatus, a web of porous filter media located between said tanks and

adjacent said one end of said apparatus, said filter media being located above said reservoir, means defining a flow path from said second tank to the upper side of said filter media whereby liquid in said second tank flows to and then through said filter media and then flows to said reservoir while particles in such liquid are caught by said filter media, and means for periodically advancing said filter media toward said one end of said apparatus and into said collection area.

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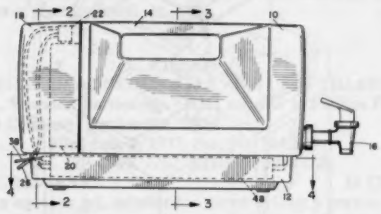
## 4,110,219
## REVERSE OSMOSIS WATER UNIT

**Paul Douglas Maples, 772 S. Sierra Ave., Solana Beach, Calif. 92075**

**Filed Feb. 2, 1977, Ser. No. 764,828**
**Int. Cl.² B01D *31/00*; C02B *1/82***
**U.S. Cl. 210—245** **8 Claims**



1. A reverse osmosis water unit comprising:
a portable water container for receiving and dispensing treated water,
base means for supporting said water container,
said base means having a recessed volume with end walls,
reverse osmosis water treating means for being laid lengthwise in said recess between said spaced walls,
water conduit means for conducting water to said reverse osmosis means and for conducting treated water from said reverse osmosis means to said water container,
removable stopper type end connector means for connecting the ends of said reverse osmosis means to said water conduit means by a slip connection,
sealing means for sealing the connection of said end connector means to said reverse osmosis means against water leakage,
and the composite length of said reverse osmosis means and the connected end connector means being slightly less than the distance between said end walls of said base means, whereby said walls prevent outward sliding movement of said end connectors when said reverse osmosis means are positioned in the recess volume of said base means.

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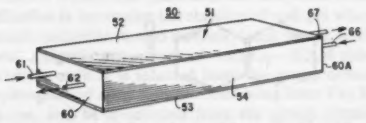
## 4,110,220
## MASS TRANSFER DEVICE

**Ardis R. Lavender, 6 Starlight Dr., Clarks Summit, Pa. 18411**

**Filed Oct. 18, 1976, Ser. No. 733,445**
**Int. Cl.² B01D *13/00***
**U.S. Cl. 210—321 R** **21 Claims**



1. A parallel flow device for effecting mass transfer between first and second fluids, said device comprising a first fluid inlet and outlet and a second fluid inlet and outlet, a plurality of plates forming a stack, a membrane positioned between adjacent plates and cooperating therewith to form on opposite sides of each membrane a first fluid channel and a second fluid channel, said first and second fluid inlets and outlets being connected respectively to said first and second fluid channels to introduce fluid into and remove fluid from said channels in a direction coplanar with each of said plates. said membranes being effective to permit mass transfer between a first fluid in said first fluid channels and a second fluid in said fluid channels, manifold means associated with each plate for receiving a first fluid stream from said first fluid inlet and dividing the inlet stream into only two identical streams a plurality of times to provide an even number of streams evenly and uniformly spaced across the plate thereby distributing the first fluid stream transversely across the associated plate at one end of said first fluid channel, manifold means associated with each plate for transporting fluid to said first fluid outlet by evenly and uniformly collecting the first fluid transversely across the associated plate from the other end of said first fluid channel, manifold means associated with each plate for receiving a second fluid stream from said second fluid inlet and dividing the second inlet stream into only two identical streams a plurality of times to provide an even number of streams evenly and uniformly spaced across the plate thereby distributing the second fluid stream transversely across the associated plate at one end of said second fluid channel, and manifold means associated with each plate for transporting fluid to said second fluid outlet by evenly and uniformly collecting the second fluid transversely across the associated plate from the other end of said second fluid channel, each manifold containing the identical even number of branches to provide substantially identical flow resistance through all corresponding branches.

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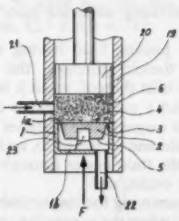
## 4,110,221
## LIQUID FILTRATION DEVICE

**Fernand Moser, Corgemont, Switzerland, assignor to Louis Moser, Switzerland**

**Filed Apr. 6, 1977, Ser. No. 785,222**
**Claims priority, application Switzerland, Apr. 12, 1976, 4604/76**
**Int. Cl.² B01D *23/00***
**U.S. Cl. 210—481** **9 Claims**



1. A coffee filter, comprising; a cup-shaped member having a bottom, a bottom outlet for coffee, a wall upstanding from the bottom, and an inner edge on the wall, remote from the bottom, defining an aperture, the cup-shaped member being, in use, insertable in a coffee-making device with slidable engagement of the wall with an inner surface of the device to define a chamber for particles of ground coffee by said inner surface above said edge, and with an inlet for water to said chamber; and a circular member generally disposed in the aperture to generally close it, the circular member having an upper, outer edge to define a slot-like gap between the outer and inner edges for filtering a liquid through the slot to the bottom outlet to separate the liquid from particles of ground coffee contained therein; one of the members having wall surface of a generally frusto-conical configuration disposed opposite a wall surface of the other member so that the surfaces diverge from one another from the slot-like gap toward the bottom of the cup-

shaped member, and so that the slot-like gap has a width defining a size of solid particles to be filtered through the gap.

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**4,110,222**

## APPARATUS FOR SEPARATING MAGNETIZABLE PARTICLES FROM A FLUID

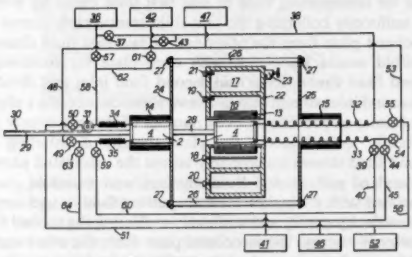
**James Henry Peter Watson, St. Austell, England, assignor to English Clays Lovering Pochin & Company Limited, Cornwall, England**

**Filed Apr. 12, 1976, Ser. No. 675,885**

**Claims priority, application United Kingdom, Apr. 11, 1975, 15079/75**

**Int. Cl.² B01D *35/06***

**U.S. Cl. 210—222** **17 Claims**



1. Moving matrix apparatus for separating magnetisable particles from a fluid in which they are suspended, which apparatus comprises:

(a) a magnet for establishing a magnetic field in a first zone remote from a second zone;

(b) at least one elongate separating chamber having a fluid inlet and a fluid outlet therein, the separating chamber having at least portions thereof near each end each comprising a magnetic field concentrating element of ferromagnetic material;

(c) a fluid permeable packing of magnetisable material disposed in the separating chamber between the inlet and outlet thereof;

(d) means for moving the separating chamber including the field concentrating elements into, and out of, the first zone;

(e) means for passing fluid having magnetisable particles suspended therein through the separating chamber through the inlet thereof, when it is positioned within the first zone and a magnetic field is established in the first zone, so that magnetisable particles are magnetised by the magnetic field and attracted to, and retained in, the packing, whilst the fluid passes through the packing and exits through the outlet, and

(f) means for removing the magnetisable particles retained in the packing, when the separating chamber is positioned in the second zone remote from the first zone.

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**4,110,223**

## APPARATUS FOR RECOVERING EMBRYOS FROM EMBRYONATED EGGS

**William J. McAleer, Ambler, and William M. Hurni, North Wales, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.**

**Continuation of Ser. No. 572,584, Apr. 28, 1975, abandoned. This application Nov. 23, 1976, Ser. No. 744,228**

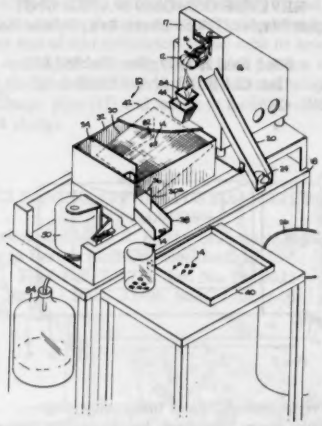
**Int. Cl.² B01D *33/22*; A23J *1/09***

**U.S. Cl. 210—388** **11 Claims**

1. Apparatus for recovering embryos from embryonated eggs comprising

an egg cracking and opening mechanism operative to crack open an egg and release the contents thereof to a predetermined area of a flat screen positioned under the mechanism, the screen having an edge farthest from the egg cracking and opening mechanism and the screen being tilted at a compound angle from horizontal whereby one portion of the screen is uppermost and the diagonally opposite portion is lowermost,

a partition extending along part of the edge of the screen furthest from the egg cracking and opening mechanism and terminating before the lowermost portion of the screen, the lowermost portion of the screen communicating with a tilted embryo discharge chute,



means operative to produce continual shaking of the screen and in cooperation with the screen tilted at a compound angle from the horizontal to move the contents of the egg in a random path away from the predetermined area of the screen to the embryo discharge chute and to provide separation of the more fluid portions of the contents from the more solid embryo portion, said more fluid portion passing through said screen and said embryo portion passing down said screen to said embryo discharge chute.

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**4,110,224**

## SECONDARY RECOVERY PROCESS UTILIZING WATER SATURATED WITH GAS

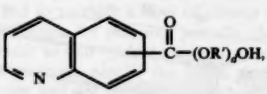
**Joseph C. Allen, Bellaire, Tex., assignor to Texaco Inc., New York, N.Y.**

**Continuation-in-part of Ser. No. 724,894, Sep. 20, 1976, abandoned, which is a division of Ser. No. 564,390, Apr. 2, 1975, Pat. No. 4,044,831. This application May 27, 1977, Ser. No. 801,186**

**Int. Cl.² E21B *43/22***

**U.S. Cl. 252—8.55 D** **6 Claims**

1. A fluid comprising water saturated with a gas selected from the group consisting of natural gas, carbon dioxide, ammonia, flue gas and mixtures thereof containing a minor amount of a solubilizing agent consisting of a compound of the formula:



wherein R' is alkylene of from about 2 to 5 carbon atoms and *d* is an integer of from about 5 to about 50, wherein said fluid is made alkaline through the addition of an alkaline agent selected from the group consisting of sodium hydroxide, potassium hydroxide and sodium hypochlorite.

## 4,110,225
## SEALING WELLS

William S. Cagle, Tulsa, Okla., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Mar. 3, 1975, Ser. No. 554,845
Int. Cl.[2] C09K 7/00
U.S. Cl. 252—8.5 LC 7 Claims

1. A method of sealing wellbores against lost circulation and the like comprising

(a) preparing an aqueous pumpable slurry of at least about 25 barrels containing per barrel at least 35 pounds of oil well cement, from about 5 to 50 pounds of diatomaceous earth, at least 5 pounds of lost-circulation agent other than diatomaceous earth;

(b) isolating a zone in said well so that hydraulic pressure above formation pressure at said zone may be applied; and

(c) pumping said slurry into said zone and maintaining a pressure thereon slightly above formation pressure for a period of at least about eight hours and until said slurry has at least an initial set.

## 4,110,226
## STABILIZED AQUEOUS GELS AND USES THEREOF

Billy L. Swanson, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Feb. 2, 1977, Ser. No. 764,924
Int. Cl.[2] C09K 7/02; E21B 43/22, 43/26
U.S. Cl. 252—8.5 C 14 Claims

8. An aqueous gel, suitable for use as at least a portion of a fluid medium in a process wherein a said fluid medium is introduced into a borehole in the earth and into contact with a subterranean formation penetrated by said borehole, said gel comprising an aqueous brine having incorporated therein:

a water-thickening amount of a water-soluble cellulose ether;

a water-soluble compound of a polyvalent metal, wherein said compound of a polyvalent metal is a compound of chromium or manganese wherein the valence of the chromium therein is +6 and the valence of at least a portion of said chromium is reduced to +3 and wherein the valence of the manganese therein is +7 and the valence of at least a portion of said manganese is reduced to +4, in an amount which is sufficient to cause gelation of said aqueous brine containing said cellulose ether when the valence of at least a portion of said metal is reduced to said lower valence state;

a water-soluble reducing agent in an amount which is effective to reduce at least a portion of said metal to said lower valence state and cause said gelation with the formation of said gel wherein said reducing agent is selected from the group consisting of sodium or potassium sulfite, sodium or potassium hydrosulfite, sodium or potassium metabisulfite, sodium or potassium bisulfite, sodium or potassium sulfide, sodium or potassium thiosulfate, hydrogen sulfide, thioacetamide, hydroquinone, p-hydrazinobenzoic acid, hydrazine phosphite, hydrazine dichloride, and mixtures thereof;

a water-soluble sulfoalkylated tannin capable of, and in an amount sufficient for, increasing the stability of said gel to decomposition, with said amount being sufficient to provide a weight ratio of the amount of said sulfoalkylated tannin to the amount of said polyvalent metal compound which is effective to cause said sulfoalkylated tannin to be effective in increasing the stability of said gel wherein the tannin molecule in said sulfoalkylated tannin is alkylated with a significant amount of $-C(R)_2-SO_3M$ side chains wherein each R is selected from the group consisting of hydrogen and alkyl radicals containing from 1 to 5 carbon atoms, and M is selected from the group consisting of ammonium and the alkali metals, and said tannin is selected from the group consisting of the gallotannins and the flavotannins;

wherein said amount of said cellulose ether is sufficient to provide a weight ratio of the amount of said cellulose ether to the amount of said polyvalent metal compound which is also effective to cause said sulfoalkylated tannin to be effective in increasing the stability of said gel and wherein

said weight ratio of the amount of said sulfoalkylated tannin to the amount of said polyvalent metal compound is within the range of from about 6.5:1 to about 27.5:1 and wherein

said weight ratio of the amount of said cellulose ether to the amount of said polyvalent metal compound is at least about 20:1.

## 4,110,227
## OXIDATION STABLE POLYOXYALKYLENE FIBER LUBRICANTS

David Dudley Newkirk; Robert Bernard Login, both of Woodhaven, and Basil Thir, Wyandotte, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Sep. 19, 1977, Ser. No. 834,721
Int. Cl.[2] D06M 13/10
U.S. Cl. 252—8.9 21 Claims

1. A lubricant for synthetic fibers comprising a polyoxyalkylene lubricant compound having the formula:

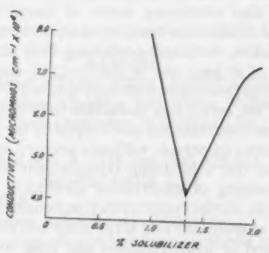
$$R-\overset{\overset{O}{\|}}{C}-(O-R_1-O-R_2)_m-R_3-(O-R_1-O-R_2)_n-OH$$

wherein R is an alkyl group having 1 to about 21 carbon atoms, $m + n$ has a value to produce a molecular weight of about 300 to about 2000, $R_1$ and $R_2$ are the residues of the same or different alkylene units derived from alkylene oxides individually selected from the group consisting of ethylene oxide, propylene oxide, butylene oxide and an aromatic glycidyl ether and $R_3$ is the residue of a difunctional phenol.

## 4,110,228
## SALINITY TOLERANT SURFACTANT OIL RECOVERY PROCESS

Timothy N. Tyler, Houston, Tex.; Melvin E. Mills, Jr., Salem, Ill.; John A. Wells, and Joseph T. Carlin, both of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 1, 1976, Ser. No. 746,643
Int. Cl.[2] E21B 43/22
U.S. Cl. 252—8.55 D 7 Claims




1. In a method of recovering petroleum from a subterranean, petroleum-containing, permeable formation penetrated by least two wells in fluid communication with the formation, said formation also containing water of known or determinable salinity and divalent ion concentration, comprising injecting an aqueous surfactant-containing fluid into the formation by means of at least one of the wells to displace petroleum toward at least one other well from which it is recovered to the surface of the earth, said surfactant fluid comprising an aqueous fluid having salinity and divalent ion concentration about equal to the formation water, containing an organic sulfonate primary anionic surfactant and at least one solubilizing co-surfactant

selected from the group consisting of ethoxylated aliphatic alcohols, ethoxylated alkylphenols, ethoxylated alkylthiols, ethoxylated alkylarylthiols, alkylpolyethoxyalkyl sulfonates having from 8 to 22 carbon atoms in the first alkyl chain and the second alkyl is ethyl, propyl or hydroxypropyl and from 2 to 12 ethoxy groups per molecule, alkylarylpolyethoxyalkyl sulfonates having from 8 to 15 carbon atoms in the first alkyl chain and the second alkyl is ethyl, propyl or hydroxypropyl and from 2 to 12 ethoxy groups per molecule, alkylpolyethoxy sulfates having from 8 to 22 carbon atoms in the alkyl chain and from 2 to 12 ethoxy groups per molecule, alkylarylpolyethoxy sulfates having from 8 to 15 carbon atoms in the alkyl chain and from 2 to 12 ethoxy groups per molecule, wherein the improvement comprises

(a) identifying the ratio of solubilizing co-surfactant and primary anionic surfactant at which the above mixture of surfactants is borderline soluble in the fluid by a method comprising:

(1) preparing a series of at least four samples having a total surfactant concentration between 1.0 and 4.0 percent by weight and weight ratios of solubilizing co-surfactant to primary surfactant from 0.1 to 4.0;

(2) measuring the electrical conductivities of the samples creating a graphical plot of electrical conductivity versus weight ratio of solubilizing co-surfactant to organic sulfonate primary anionic surfactant, and identifying the ratio of surfactant concentration corresponding to the first inflection in the function of electrical conductivity versus concentration of solubilizing co-surfactant as the concentration of solubilizing co-surfactant is increased from a value insufficient to render the surfactants soluble in the fluid;

(b) blending the anionic primary surfactant and the solubilizing co-surfactant in a ratio at which they are borderline soluble as determined above.

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**4,110,229**

## SALINITY TOLERANT SURFACTANT OIL RECOVERY PROCESS

**Joseph T. Carlin; Timothy N. Tyler, both of Houston, Tex.; Melvin E. Mills, Jr., Salem, Ill., and James W. Ware, Tulsa, Okla., assignors to Texaco Inc., New York, N.Y.**

**Filed Dec. 1, 1976, Ser. No. 746,646**
**Int. Cl.[2] E21B *43/22***
**U.S. Cl. 252—8.55 D** **5 Claims**

1. In a method of recovering petroleum from a subterranean, petroleum-containing, permeable formation penetrated by at least two wells in fluid communication with the formation, said formation also containing water of know or determinable salinity and divalent ion concentration, comprising injecting an aqueous, saline, surfactant-containing fluid into the formation by means of at least one of the wells to displace petroleum toward at least one other well from which it is recovered to the surface of the earth, said surfactant fluid having salinity and divalent ion concentration about equal to the formation water and containing an organic sulfonate primary anionic surfactant and at least one solubilizing co-surfactant selected from the group consisting of ethoxylated alkylthiols, ethoxylated alkylarylthiols, alkylpolyethoxyalkyl sulfonates having from 8 to 22 carbon atoms in the first alkyl chain and the second alkyl is ethyl, propyl or hydroxypropyl and from to 2 to 12 ethoxy groups per molecule, alkylarylpolyethoxyalkyl sulfonates having from 8 to 15 carbon atoms in the first alkyl chain and the second alkyl is ethyl, propyl or hydroxypropyl, and from 2 to 12 ethoxy groups per molecule, alkylpolyethoxy sulfates having from 8 to 22 carbon atoms and from 2 to 12 ethoxy groups per molecule, alkylaryl polyethoxy sulfates having from 8 to 15 carbon atoms in the alkyl chain and from 2 to 12 ethoxy groups per molecule, wherein the improvement comprises

(a) determining the ratio of primary anionic surfactant to solubilizing co-surfactant which results in the surfactant mixture exhibiting borderline solubility in the fluid by a method comprising:

(1) preparing a series of at least four samples having total surfactant concentration between 1.0 and 4.0 percent by weight and weight ratios of solubilizing co-surfactant to primary anionic surfactant from 0.1 to 4.0;

(2) mixing the samples and allowing them to stand for at least 12 hours; and

(3) identifying the minimum ratio of solubilizing co-surfactant to primary anionic surfactant which exhibits a single phase condition; and

(b) blending the organic sulfonate primary anionic surfactant and a solubilizing co-surfactant in the minimum ratio determined above which achieves borderline solubility of the surfactants in the aqueous surfactant fluid.

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**4,110,230**

## AQUEOUS GELABLE COMPOSITIONS HAVING EXTENDED GELATION TIME AND METHODS OF PREPARING SAME

**James E. Hessert, and Chester C. Johnston, Jr., both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Division of Ser. No. 441,848, Feb. 12, 1974, Pat. No. 3,926,258, which is a continuation-in-part of Ser. No. 318,847, Dec. 27, 1972, abandoned. This application Oct. 6, 1975, Ser. No. 620,082**
**Int. Cl.[2] C09K *3/00***
**U.S. Cl. 252—855 R** **14 Claims**

1. An aqueous gelable composition having an extended or increased time of gelation, said composition comprising water to which there has been added:

a water-thickening amount of a water-dispersible polymer selected from the group consisting of (a) water-soluble cellulose ethers; (b) polyacrylamides and polymethacrylamides wherein up to about 75 percent of the carboxamide groups can be hydrolyzed to carboxyl groups; crosslinked polyacrylamides and cross-linked polymethacrylamides wherein up to about 75 percent of the carboxamide groups can be hydrolyzed to carboxyl groups; polyacrylic acid and ppolymethacrylic acid; polyacrylates; polymers of N-substituted acrylamides wherein the nitrogen atoms in the carboxamide groups can have from 1 to 2 alkyl substituents which contain from 1 to 4 carbon atoms; copolymers of acrylamide or methacrylamide with another ethylenically unsaturated monomer copolymerizable therewith, sufficient acrylamide or methacrylamide being present in the monomer mixture to impart said water-dispersible properties to the resulting copolymer when it is mixed with water, and wherein up to about 75 percent of the carboxamide groups can be hydrolyzed to carboxyl groups, and mixtures thereof; and (c) a bipolysaccharide produced by the action of bacteria of the genus Xanthomonas on carbohydrates;

an amount of a water-soluble compound of a polyvalent metal selected from the group consisting of water soluble compounds of chromium and manganese wherein the metal is present in a first valence state and is capable of being reduced to metal ions having a lower polyvalent valence state, which amount is sufficient to cause gelation of said water containing said polymer when the valence of at least a portion of said metal is reduced to produce said metal ions having said lower valence state as described hereinafter;

an amount of a complexing agent capable of complexing with said ions of said metal having said reduced valence state, wherein said complexing agent is selected from the group consisting of citrates, tartarates, acetates, phosphates, hydrophosphates and arsenates, wherein said amount is sufficient to complex with at least a portion of said ions and cause said extended gelation time when said ions are produced as described hereinafter; and

an amount of a water-soluble reducing agent which is effective to reduce at least a portion of said metal to said metal ions having said lower valence state, with said reducing agent being added to said water after said complexing agent has been added thereto.

4,110,231

## STABILIZED AQUEOUS GELS AND USES THEREOF

Billy L. Swanson, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Feb. 2, 1977, Ser. No. 764,925
Int. Cl.[2] C09K *7/02*; E21B *43/22, 43/26*
U.S. Cl. 252—8.5 C 14 Claims

8. An aqueous gel, suitable for use as at least a portion of a fluid medium in a process wherein a said fluid medium is introduced into a borehole in the earth and into contact with a subterranean formation penetrated by said borehole, said gel comprising an aqueous brine having incorporated therein:

a water-thickening amount of a water-soluble cellulose ether;

a water-soluble compound of a polyvalent metal, wherein said compound of a polyvalent metal is a compound of chromium or manganese wherein the valence of the chromium therein is +6 and the valence of at least a portion of said chromium is reduced to +3 and wherein the valence of the manganese therein is +7 and the valence of at least a portion of said manganese is reduced to +4 valence state, in an amount which is sufficient to cause gelation of said aqueous brine containing said cellulose ether when the valence of at least a portion of said metal is reduced to said lower valence state;

a water-soluble reducing agent in an amount which is effective to reduce at least a portion of said metal to said lower valence state and cause said gelation with the formation of said gel wherein

said reducing agent is selected from the group consisting of sodium or potassium sulfite, sodium or potassium hydrosulfite, sodium or potassium metabisulfite, sodium or potassium bisulfite, sodium or potassium sulfide, sodium or potassium thiosulfate, hydrogen sulfide, thioacetamide, hydroquinone, p-hydrazinobenzoic acid, hydrazine phosphite, hydrazine dichloride, and mixtures thereof; and

a water-soluble lignosulfonate capable of, and in an amount sufficient for, increasing the stability of said gel to decomposition, with said amount being sufficient to provide a weight ratio of the amount of said lignosulfonate to the amount of said polyvalent metal compound which is effective to cause said lignosulfonate to be effective in increasing the stability of said gel wherein said weight ratio of the amount of said lignosulfonate to the amount of said polyvalent metal compound is within the range of from about 3.5:1 to about 8.5:1.

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4,110,232

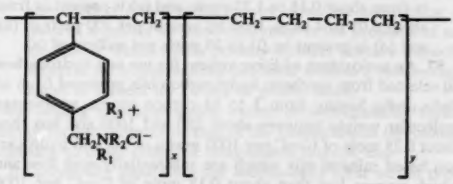
## WATERFLOODING PROCESS EMPLOYING CATIONIC-NONIONIC COPOLYMERS

Frederick C. Schwab, Metuchen; Edward W. Sheppard, Lambertville, and Catherine S. H. Chen, Berkeley Heights, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 15, 1977, Ser. No. 787,807
Int. Cl.[2] E21B *43/22*
U.S. Cl. 252—8.55 B 6 Claims

1. In a method of recovering oil from an oil-containing subterranean formation penetrated by an injection well and a production well and wherein an aqueous fluid is injected via said injection well into said formation to displace said oil to said production well, the improvement comprising:

employing in at least a portion of said aqueous fluid injected via said injection well into said formation a water soluble copolymer having a molecular weight within the range of 50,000 to 500,000, said copolymer being employed in a sufficient amount to thicken said portion of said aqueous fluid and provide improved efficiency in displacing said oil to said production well, said water soluble copolymer being formed of hydrogenated polybutadiene segments and polystyrene segments chemically modified to strong polyelectrolytes with cationic sites fixed onto the polymer backbone, said polystyrene segments having been first chloromethylated by reacting with chloromethyl ether or formaldehyde and hydrogen chloride and then quaterized by reacting with a tertiary amine to form strong polyelectrolytes with cationic sites fixed onto the polymer backbone, said copolymer having the following structural formula:




wherein:

$R_1$, $R_2$, and $R_3$ are alkyl groups containing 1 to 18 carbon atoms, and

$x$ to $y$ is a ratio that is equal to or greater than about 1.

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4,110,233

## LITHIUM BASE GREASE CONTAINING POLYISOBUTYLENE

Wayne W. Bailey, and Brian W. Taylor, both of Gibsonia, Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Dec. 27, 1976, Ser. No. 754,250
Int. Cl.[2] C10M *1/24, 3/18, 5/14, 7/20*
U.S. Cl. 252—41 9 Claims

1. A lubricating grease composition specially suitable for the lubrication of heavy steel processing equipment and having improved resistance of removal by water, improved pumpability over a wide range of ambient temperatures, and the ability to float on water consisting essentially of:

(1) a petroleum base of lubricating viscosity ranging from about 7 to about 13 centristokes as measured by ASTM D-445 at 98.9° C and having a specific gravity ranging from about 0.9279 to about 0.8654 at 15.6° C;

(2) a lithium soap of a fatty acid having from about 10 to about 30 carbon atoms as a thickener in an amount from about 3 to about 20 percent by weight of the lubricating grease composition; and

(3) a polyisobutylene in an amount from about 5 to about 12.5 percent by weight of the lubricating grease composition and of a molecular weight from about 75,000 to about 125,000 as measured by the Staudinger method, to confer said improved water resistance and pumpability on the composition.

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4,110,234

## ANTIOXIDANT STABILIZED LUBRICATING OILS

Frederick C. Loveless, Cheshire, and Walter Nudenberg, Newtown, both of Conn., assignors to Uniroyal, Inc., New York, N.Y.

Filed Nov. 5, 1975, Ser. No. 629,162
Int. Cl.[2] C10M *1/38*
U.S. Cl. 252—47.5 82 Claims

1. An antioxidant stabilized oil comprising:

(a) a hydrocarbon oil selected from synthetic hydrocarbon oils prepared from an alpha-olefin having 3 to 14 carbon atoms, having an average molecular weight between about 280 and 1000, and less than about 0.25 mole of C=C per 1000 grams of oil, and hydrocarbon based mineral oils which are substantially acid free and which possess less than 0.15 mole of C=C per 1000 grams of oil; and

(b) a phenylated naphthylamine;

(c) a sulfur-containing compound being selected from compounds of the formulae R—S—R and R—SS—R wherein the R groups are the same or different and are selected from the group consisting of alkyl, aryl, aralkyl, alkaryl, alkanoate, thiazole, imidazole, phosphorothionate, and $\beta$-ketoalkyl radicals, and where applicable, said sulfur

containing compound contains no more than one phenyl to sulfur bond; and

(d) a metal selected from the Groups VIII, Ib and IIb of the Periodic Table and having an atomic number greater than 26 with the exception of silver (47); wherein (b) is present in from about 0.15 to 1.25 parts, and (c) is present in from about 0.05 to 4 parts, both by weight per 100 parts of (a), and (d) is present in .01 to 25 parts per million of (a).

57. An antioxidant additive system for use in a hydrocarbon oil selected from synthetic hydrocarbon oils prepared from an alpha-olefin having from 3 to 14 carbon atoms, an average molecular weight between about 280 and 1000 and less than about 0.25 mole of C=C per 1000 grams of oil, and hydrocarbon based mineral oils which are substantially acid free and which possess less than about 0.15 mole of C=C per 1000 grams of oil, comprising:

(a) a phenylated naphthylamine;

(b) a sulfur-containing compound being selected from compounds of the formulae R—S—R and R—SS—R wherein the R groups are the same or different and are selected from the group consisting of alkyl, aryl, aralkyl, alkaryl, alkanoate, thiazole, imidazole, phosphorothionate and $\beta$-ketoalkyl radicals, and where applicable with the proviso that said sulfur-containing compound contains no more than one phenyl to sulfur bond; and

(c) a metal selected from Groups VIII, Ib and IIb of the Periodic Table and having an atomic number greater than 26 with the exception of silver; and wherein (a) is present in about 0.15 to 1.25 parts and (b) is present in from about 0.05 to 4 parts, both by weight, per 100 parts of oil, and (c) is present in from 0.01 to 25 parts per million of the oil.

68. A method of stabilizing a hydrocarbon oil selected from synthetic hydrocarbon oils prepared from an alpha-olefin having from 3 to 14 carbon atoms, an average molecular weight between about 280 and 1000 and less than about 0.25 mole of C=C per 1000 grams of oil, and hydrocarbon based mineral oils which are substantially acid free and which possess less than 0.15 mole of C=C per 1000 grams of oil comprising combining therewith

(a) a phenylated naphthylamine,

(b) a sulfide compound selected from compounds of the formulae R—S—R and R—SS—R wherein the R groups are the same or different and are selected from the group consisting of alkyl, aryl, aralkyl, alkaryl, alkanoate, thiazole, imidazole, phosphorothionate, and $\beta$-ketoalkyl radicals, and where applicable said sulfur-containing compound contains no more than one phenyl to sulfur bond; and

(c) a metal selected from Groups VIII, Ib and IIb of the Periodic Table and having an atomic number greater than 26, with the exception of silver; and wherein (a) is present in from about 0.15 to 1.25 parts, and (b) is present in from about 0.05 to 4 parts, both by weight per 100 parts of oil, and (c) is present in from about 0.01 to 25 parts per million of the oil.

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**4,110,235**

## ETHYLENE-HYDROCARBON COPOLYMERIC VISCOSITY IMPROVERS CONTAINING COLOR AND STABILITY IMPROVERS

**James O. Waldbillig, Wappingers Falls; Carmen M. Cusano, Poughkeepsie, both of N.Y.; David D. Reed, Tokyo, Japan, and Richard L. Winstead, Hopewell Junction, N.Y., assignors to Texaco Inc., New York, N.Y.**

**Filed Mar. 30, 1977, Ser. No. 782,862**

**Int. Cl.[2] C10M *1/32, 3/26, 5/20, 7/30***

**U.S. Cl. 252—51.5 R** **8 Claims**

1. A color and viscosity stabilized, viscosity index improving additive package for a lubricating oil comprising a copolymeric ethylene-$\alpha$-olefin viscosity index improver and from 0.005 to 5.0 weight percent of a stabilizer consisting of at least one compound of the group of N,N'-bis(2-hydroxy-5-alkylbenzyl)$\alpha,\Omega$-diaminoethane wherein said alkyl group contains from 4 to 30 carbon atoms and the calcium, barium, magnesium and zinc salts thereof.

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**4,110,236**

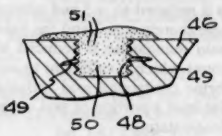
## NONDESTRUCTIVE MAGNETIC RECORDING MEDIUM

**Orlando G. Molina, Westminster, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.**

**Division of Ser. No. 420,327, Nov. 29, 1973, Pat. No. 3,978,398. This application Apr. 19, 1976, Ser. No. 678,279**

**Int. Cl.[2] H01F *1/117***

**U.S. Cl. 252—62.54** **5 Claims**




1. A magnetizable putty-like recording medium for magnetic particle inspection of an object, comprising a material selected from the group of polymers and resins consisting essentially of silicone polymers, urethane polymers, natural rubber, neoprene, carboxyl terminated polybutadiene, and guar gum, said polymers and resins having a viscosity such that said polymers have putty-like characteristics, and including magnetic particles distributed therein, said material being highly pliable and moldable so that it can be applied to a part surface and pressed by light pressure against the surface to fill any gaps between the putty-like material and the surface of the part, said recording medium being demagnetizable following magnetization, and reuseable, said magnetic particles being present in an amount of about 5 to about 60%, by weight of said polymers and resins.

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**4,110,237**

## COMPOSITIONS CONTAINING A DIAZINE AND A HALOGEN COMPOUND FOR CATALYZING COPPER ETCHING SOLUTIONS

**Akira Matsumoto, and Katsutoshi Itani, both of Fuji, Japan, assignors to Tokai Denka Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 618,429, Oct. 1, 1975, abandoned, which is a division of Ser. No. 510,535, Sep. 30, 1974, Pat. No. 3,936,332. This application Jun. 28, 1977, Ser. No. 810,730**

**Claims priority, application Japan, Nov. 19, 1973, 48-129156**

**The portion of the term of this patent subsequent to Feb. 3, 1993, has been disclaimed.**

**Int. Cl.[2] C09K *13/04***

**U.S. Cl. 252—79.4** **24 Claims**

1. A composition for catalyzing peroxysulfate solutions for etching copper and copper alloys comprising from 50 to 2000 parts by weight of a diazine and from 5 to 2000 parts by weight of a halogen compound which liberates halogen in an aqueous solution, said diazine being selected from the group consisting of pyrimidine, aminopyrimidine, methylpyrimidine, pyrazine, pyrazinecarboxamide, quinoxaline, pyridazine, phthalazine and cinnoline, and said halogen compound is a member selected from the group consisting of an alkali metal salt of a halogen acid, dichloroisocyanuric acid and salts thereof, and 1-chlorodiethylether.

## 4,110,238
## REDUCED-STAINING COLORANT SYSTEM

**Robert J. Lala, River Edge, N.J., assignor to Lever Brothers Company, New York, N.Y.**

**Division of Ser. No. 574,487, May 5, 1975, Pat. No. 3,958,928. This application Feb. 5, 1976, Ser. No. 655,346**

**The portion of the term of this patent subsequent to May 25, 1993, has been disclaimed.**

**Int. Cl.[2] C11D** *3/42, 3/40;* **C09B** *1/28, 1/32*

**U.S. Cl. 252—89 B** **3 Claims**

1. A method for producing a synthetic liquid detergent having a Gardner Reflectometer "*b*" color value of about −5 to −15 whereby said liquid detergent exhibits reduced staining characteristics while still retaining the ability to impart bluing to fabrics comprising admixing with said detergent a sufficient amount to produce said color value of a dye mixture consisting essentially of about 0.0005% to about 0.0030% by weight of 1,4-bis (2 ethylhexylamino)anthraquinone and at least one water soluble anthraquinone dye selected from the group consisting of 1-amino-2-sulfo, 4-(2-sulfo-para toluidino) anthraquinone sodium salt, 1,4-bis(3-sodium sulfonate-mesitylidino)anthraquinone and mixtures thereof.

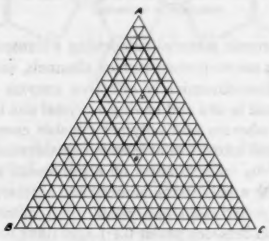
## 4,110,239
## QUICK LATHERING TOILET BARS AND METHOD OF MAKING SAME

**Leon M. Prince, Westfield, N.J., assignor to Lever Bros. Co., New York, N.Y.**

**Division of Ser. No. 419,558, Nov. 28, 1973, Pat. No. 3,989,647, which is a continuation of Ser. No. 137,228, Apr. 26, 1973, abandoned, which is a continuation-in-part of Ser. No. 54,008, Jul. 10, 1970, abandoned. This application Jun. 14, 1976, Ser. No. 695,707**

**Int. Cl.[2] C11D** *1/02*

**U.S. Cl. 252—135** **8 Claims**



1. A non-mushing high lathering synthetic toilet bar having a pH of about 4.5–9.5 and consisting essentially of based on the total weight of the actives:

i. 40% to about 85% of a primary alkane sulfonate or a mixture of alkane sulfonates wherein the carbon chain contains 12 carbon atoms or averages 12 carbon atoms;

ii. 5% to about 35% of a natural or synthetic fatty acid or mixtures thereof wherein the carbon chain contains or averages 12 carbon atoms;

iii. 5% to about 30% of a binder modifier selected from the group consisting of: alkali metal, magnesium or ammonium salts of $C_{12}$–$C_{16}$ primary alkyl phosphonates and alkali metal, magnesium or ammonium salts of $C_{12}$–$C_{16}$ primary alkyl phosphates; and

iv. based on the total weight of the bar, 5–25% water.

## 4,110,240
## COPRECIPITATION PROCESS

**Thomas J. Leo, and Anders H. Johansson, both of Yardley, Pa., assignors to Wyrough and Loser, Inc., Trenton, N.J.**

**Filed Jul. 29, 1977, Ser. No. 820,557**

**Int. Cl.[2] C08C** *1/14;* **C08J** *3/20*

**U.S. Cl. 252—182** **66 Claims**

1. A process for improving the clarity of the serum produced during coprecipitation of a rubber or plastic compounding chemical and a binder, comprising

(a) intimately mixing at least one finely divided rubber or plastic compounding chemical, wherein substantially all of the particles thereof are at least about 0.05 micron in size, with a film-forming binder emulsion comprising a latex of a rubber or plastic polymer in the presence of an amount of water which permits intimate mixture thereof, wherein no compounding chemical used is a reinforcing agent or diluent for rubber or plastic stock,

(b) adding a stoichiometric excess of a coagulating agent during further intimate mixing of the chemical and the binder emulsion to cause complete coagulation thereof, and

(c) physically separating the substantially clear serum produced upon coagulation from the homogeneous, essentially non-tacky, dustless, friable particles of predispersed chemical which comprise from about 80 to about 99.5 percent by weight of said chemical and from about 0.5 to about 20 percent by weight of said binder.

## 4,110,241
## METHOD OF MANUFACTURING ACTIVE MATERIAL FOR LEAD BATTERIES

**Vladimir Georgievich Pirkulov, prospekt A. Tsereteli, 101, kv. 27; Mikhail Arkadievich Askarov, ulitsa Makashvili, 1, and Avtandil Vladimirovich Dzhashi, ulitsa Ioseliani, 20[a], all of Tbilisi, U.S.S.R.**

**Filed May 12, 1977, Ser. No. 796,066**

**Int. Cl.[2] H01M** *4/62, 4/56, 4/57*

**U.S. Cl. 252—182.1** **2 Claims**

1. A method of manufacturing an active material for lead batteries consisting in that a synthetic acid-resistant fibres are uniformly settled in an electric field on a continuously moving horizontal band of a semiconductor material, said fibres being oriented perpendicularly to said moving band; then said moving band is covered with lead powder which fills the gaps between the fibres in a quantity sufficient for creating a layer whose thickness corresponds to the length of said synthetic fibres; the obtained mixture of fibres with lead powder is removed from the band and mixed with sulphuric acid and water.

## 4,110,242
## COMPOSITIONS AND METHOD FOR ACTIVATING OXYGEN UTILIZING N-ACYLATED URACILS AND BENZOURACILS

**Christian Hase, and Brigitte Hase, both of Erkrath-Unterbach, Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Dusseldorf-Holthausen, Fed. Rep. of Germany**

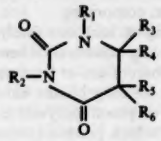
**Filed Mar. 29, 1977, Ser. No. 782,334**

**Claims priority, application Fed. Rep. of Germany, Apr. 2, 1976, 2614148**

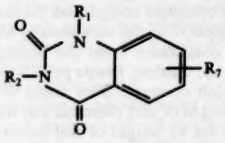
**Int. Cl.[2] A61L** *13/00*

**U.S. Cl. 252—186** **20 Claims**

1. The method of activating aqueous solutions of percompounds selected from the group consisting of hydrogen peroxide and water-soluble inorganic peroxyhydrates containing from 20 mg to 500 mg per liter of active oxygen, said solution having a pH of 4 to 12 and a temperature of from 10° C. to 70° C. which consists essentially of adding to said aqueous solution as an activator, an acylated uracil of the formula selected from the group consisting of



and



wherein at least one of $R_1$ and $R_2$ is an acyl of an acid selected from the group consisting of alkanoic acids having 2 to 4 carbon atoms and benzoic acid, and the other of $R_1$ or $R_2$ is a member selected from the group consisting of alkanoyl having 2 to 4 carbon atoms, benzoyl, and $R_3$; $R_3$, $R_4$, $R_5$ and $R_6$ are independently members selected from the group consisting of hydrogen, alkyl having 1 to 4 carbon atoms, haloalkyl having 1 to 4 carbon atoms, alkoxyalkyl having 2 to 6 carbon atoms, carboxyalkyl having 2 to 4 carbon atoms, and alkoxycarbalkyl having 3 to 6 carbon atoms, and $R_7$ is a member selected from the group consisting of hydrogen, halogen, alkyl having 1 to 4 carbon atoms, $—CO_2Me$, $—SO_3Me$, amido, cyano, sulfamido and nitro, where Me is an alkali metal or ammonium.

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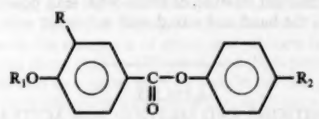
**4,110,243**

## ALKYLPHENYL 3-CYANO OR FLUORO-4-ALKYLOXYBENZOATES AND MESOMORPHIC MIXTURES THEREOF

**Marie Annick Abert-Mellah; Jean Claude Dubois, and Annie Zann, all of Paris, France, assignors to Thomson-CSF, Paris, France**

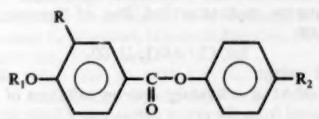
**Filed Apr. 27, 1976, Ser. No. 680,772**
**Claims priority, application France, Apr. 30, 1975, 75 13617**
**Int. Cl.² C07C *69/84, 121/75;* C09K *3/34***
**U.S. Cl. 252—299** **4 Claims**

1. A compound of the formula:



in which R is a fluoro or a nitrile radical, and wherein $R_1$ and $R_2$ are alkyl radicals ($C_nH_{2n+1}$) with $n$ being an integer of 1 to 9.

2. A mesomorphic mixture comprising (a) an organic compound of the formula:



wherein R is a fluoro or a nitrile radical, and wherein $R_1$ and $R_2$ are alkyl radicals ($C_nH_{2n+1}$) with n being an integer of 1 to 9; and (b) a liquid nematic crystal; wherein said organic compound (a) is present in an amount effective for improving the scattering effect of said liquid nematic crystal in said mesomorphic mixture; and wherein said liquid nematic crystal is 4'-pentylphenyl 4-methoxybenzoate.

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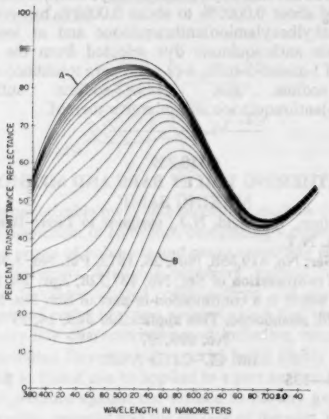
**4,110,244**

## PHOTOCHROMIC PLASTIC MATERIAL

**Richard J. Hovey, Sturbridge, Mass., assignor to American Optical Corporation, Southbridge, Mass.**

**Division of Ser. No. 694,963, Jun. 11, 1976, Pat. No. 4,049,846.**
**This application May 4, 1977, Ser. No. 793,574**
**Int. Cl.² G02B *5/23***
**U.S. Cl. 252—300** **8 Claims**




1. A photochromic material comprising a transparent cured polymer having micro-porous surface channels, said channels containing a photochromically effective amount of a silver halide crystallized in situ and having a crystal size in the range of 30 to 500A wherein said polymer consists essentially of a cross polymerized mixture of at least one unsaturated polyester resin produced by esterification of a polybasic, unsaturated organic acid with a polyhydric alcohol and a polar vinyl monomer, said polyester resin and polar vinyl monomer being present in a ratio between about 0.1:1 and 100:1.

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**4,110,245**

## GREEN COLORED FILTER GLASS

**Toshiharu Yamashita, Hachioji, Japan, assignor to Hoya Corporation, Tokyo, Japan**

**Filed Dec. 2, 1977, Ser. No. 856,896**
**Claims priority, application Japan, Dec. 2, 1976, 51-145151**
**Int. Cl.² C03C *3/16, 3/30;* F21V *9/08;* G02B *5/22***
**U.S. Cl. 252—300** **1 Claim**

1. A green colored filter glass which absorbs light with wavelengths both in the range of about 400 to about 500 mμ and in the range of about 600 to 700 mμ and which has a high light transmittance at the wavelength region of about 500 to about 600 mμ, consisting essentially of

(a) 100 parts by weight of a base glass consisting of, by weight, 40 to 85% of $P_2O_5$; 2 to 10% of $Al_2O_3$; 0 to 53% of BaO, 0 to 15% of $Li_2O$, with the total proportion of 3 to 53% BaO + $Li_2O$; 0 to 15% of NaO and/or $K_2O$; 0 to 10% of MgO, CaO, ZnO and/or PbO; 0 to 20% of SrO and 0 to 5% of $B_2O_3$, $ZrO_2$, $TiO_2$ and/or $La_2O_3$;

(b) 0.01 to 3.0 parts by weight of NiO; and

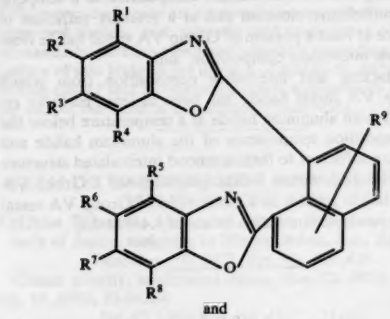
(c) 0.02 to 3.0 parts by weight of CuO.

## 4,110,246
## MIXTURE OF BENZOXAZOLE DERIVATIVES

Hans Frischkorn, Hofheim am Taunus, and Günter Rösch, Bad Soden am Taunus, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

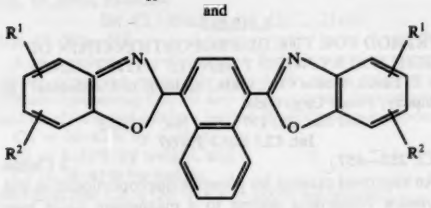
Continuation-in-part of Ser. No. 794,960, May 9, 1977, abandoned. This application Nov. 7, 1977, Ser. No. 849,090
Claims priority, application Fed. Rep. of Germany, May 13, 1976, 2621169
Int. Cl.[2] C09K *11/06*; C07D *263/56*
U.S. Cl. 252—301.28 6 Claims

1. A composition consisting essentially of 60–10% 1,7-bis-benzooxazolyl-naphthalenes and 40–90% of 1,4-bis-benzoxazolyl naphthalenes of the formulas I and II



I

and



II

wherein $R^1$ to $R^8$ each are, independent from one another, hydrogen, alkyl of 1 to 18 carbons, $C_2$–$C_4$ alkenyl, phenyl, $C_1$–$C_4$alkylphenyl, carboxy, —$COOR^{10}$, or —$SO_2R^{10}$, wherein $R^{10}$ is a straight chain or branched alkyl of 1 to 18 carbons, $C_1$–$C_4$-hydroxyalkyl, $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-alkyl, N,N-di-$C_1$–$C_4$-alkylamino-$C_1$–$C_4$-alkyl or the corresponding quaternary trialkylammoniumalkyl or $C_1$–$C_4$-alkylphenyl, or wherein two adjacent groups can form together a $C_4$-alkylene group or a fused benzo ring and $R^9$ is hydrogen, $C_1$–$C_4$-alkyl, chlorine, cyano or —$COOR^{11}$ or —$SO_2OR^{11}$, wherein $R^{11}$ is hydrogen, $C_1$–$C_4$-alkyl, phenyl or $C_1$–$C_4$-alkylphenyl.

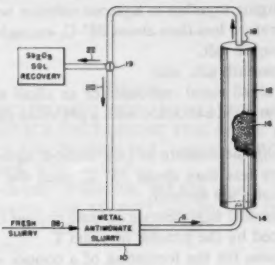
## 4,110,247
## METHOD OF PREPARING COLLOIDAL SOL OF ANTIMONY OXIDE

Reginald Price Gower, II, South Euclid, and John Gilbert Richardson, Brook Park, both of Ohio, assignors to The Harshaw Chemical Company, Cleveland, Ohio

Filed Apr. 7, 1977, Ser. No. 785,375
Int. Cl.[2] B01J *13/00*
U.S. Cl. 252—313 R 4 Claims

1. A method of preparing a colloidal aqueous sol of antimony pentoxide from a water-insoluble metal antimonate comprising:

(a) preparing an aqueous slurry of a water-insoluble metal antimonate, and




(b) passing the aqueous slurry through a fluidized bed containing a cation exchange resin whereby metal antimonate is converted to colloidal antimony pentoxide.

## 4,110,248
## MANUFACTURE OF CATALYSTS FOR POLYMERIZATION OF OLEFINS

Stylianos Sandis, Lavera, and Jean Claude Bailly, Martigues, both of France, assignors to Naphtachimie Societe Anonyme, Paris, France

Filed Feb. 1, 1977, Ser. No. 764,566
Claims priority, application France, Feb. 3, 1976, 76 02898
Int. Cl.[2] C08F *4/64*
U.S. Cl. 252—429 B 8 Claims

1. In a process for the production of solid catalysts based on titanium trichloride used in the polymerization of alpha-olefins wherein titanium tetrachloride is reduced by an organoaluminum compound to form a precipitate, and then the precipitate is aged in the presence of its formation media, the improvement comprising reducing the titanium tetrachloride with the organoaluminum compound such that the ratio of the number of titanium tetrachloride moles to the number of organic gram equivalents of the organoaluminum compound is at least equal to 1.8, with the organoaluminum compound being a compound having the general formula $AlR_nX_{3-n}$ in which R is an alkyl, cycloalkyl, aryl or aralkyl group containing 1 to 12 carbon atoms, X is a hydrogen or halogen atom, and $n$ is an integer or fraction which can assume any value between 1 and 3, the process being performed in the presence of 2 to 5 moles, per mole of organoaluminum compound, of one or several aliphatic ethers of formula R′—O—R″ in which R′ and R″ are alkyl groups containing 1 to 5 carbon atoms, at least a portion of said ether being mixed with the organoaluminum compoound in the absence of the titanium tetrachloride, the ratio of the number of moles of ether to the number of moles of the organoaluminum compound in said mixture being between 0.3 and 5, the reduction of the titanium tetrachloride is performed between −10° and +60° C, and the aging of the precipitate is performed between 20° and 100° C, for a period between 15 minutes and 24 hours, and recovering the solid catalyst.

## 4,110,249
## PREPARATION OF BISMUTH MODIFIED SPHEROIDAL MALACHITE

Joseph Melvin Fremont, Glen Mills, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 711,724, Aug. 5, 1976, abandoned. This application Jun. 6, 1977, Ser. No. 803,261
Int. Cl.[2] B01J *27/20*
U.S. Cl. 252—431 R 8 Claims

1. A process for producing spheroidal agglomerates of basic copper carbonate crystals, at least about 80% of the agglomerates being 5 to 12 microns in the longest dimension, the ag-

glomerates containing 1 to 4% by weight of bismuth oxycarbonate, the process consisting essentially of

(A) forming amorphous gel-like hydrated copper carbonate by bringing together in aqueous solution with mixing, at a temperature less than about 55° C, enough of

(1) a cupric salt,

(2) a bismuth salt, and

(3) an alkali metal carbonate or an alkali metal bicarbonate, to yield a mixture with a pH value of 5.5 to 7.5; and then

(B) holding the mixture of (A), without agitation, at a temperature less than about 55° C, until the spheroidal agglomerates are formed.

4. A spheroidal agglomerate of basic copper carbonate crystals, produced by the process of claim 1.

6. A process for the formation of a copper acetylide complex, the process consisting essentially of subjecting the product of claim 4, as a slurry in an aqueous medium, to the action of formaldehyde and acetylene.

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**4,110,250**

## AMMOXIDATION PROCESS AND CATALYST

**Howard P. Angstadt, Media, Pa., assignor to Suntech, Inc., Wayne, Pa.**

**Division of Ser. No. 750,092, Dec. 13, 1976, Pat. No. 4,044,042. This application Apr. 19, 1977, Ser. No. 788,864**

**Int. Cl.[2] B01J** *21/02, 27/02, 23/16*

**U.S. Cl. 252—432** **7 Claims**

1. A catalyst consisting essentially of an alkali metal vanadium bronze supported on α-alumina and promoted with about 2 to about 3% of tellurium, about 2 to about 3% of titanium and about 0.15 to about 0.3% of boron, said percentages being by weight of the total catalyst and its support and wherein said promoters are in the form of their oxides.

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**4,110,251**

## METAL OXYHALIDE CATALYTIC COMPOSITIONS

**Alan Lauder, Newark, and Elrey L. McCann, III, Wilmington, both of Del., assignors to E. I. Du Pont de Nemours & Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 566,107, Apr. 8, 1975, abandoned. This application Sep. 22, 1976, Ser. No. 725,584**

**Int. Cl.[2] B01J** *27/12, 27/10*

**U.S. Cl. 252—442** **21 Claims**

1. A catalytic composition of the general formula $ABO_{3-f}X_f$ and having a perovskite crystal structure, wherein

the Type A cations are cations of at least one metal selected from the Groups IA, IB, IIA, IIB, IIIB, IVA, VA, the lanthanide rare earth metals and the actinide rare earth metals, said cations having ionic radii between about 0.8 to 1.65 Angstroms;

the Type B cations are cations of at least one metal selected from Groups IA, IIA, IIB, IIIA, IIIB, IVA, IVB, VA, VB, VIB, VIIB, the metals of atomic numbers 24 to 30, and the platinum metals, said cations having ionic radii between about 0.4 to 1.4 Angstroms;

with the proviso that at least 1% of the Type B cations are cations of at least one metal selected from the metals having atomic numbers 24 to 30,and the platinum metals;

O is oxide;

X is fluoride or chloride; and

$f$ is about 0.01 to 1.0.

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**4,110,252**

## CATALYTICALLY ACTIVE $ALCL_3$-GRAPHITE INTERCALATE

**Clifford E. Smith, and Hans D. Holtz, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Dec. 6, 1976, Ser. No. 748,085**

**Int. Cl.[2] B01J** *27/10, 27/08*

**U.S. Cl. 252—442** **9 Claims**

1. A method for preparing an intercalate composition comprising graphite and aluminum halide comprising:

(1) contacting graphite with a Group VA metal halide at a temperature below the decomposition temperature of the Group V halide and pressure sufficient and for a time sufficient to form a first intercalate composition,

(2) treating said first intercalate composition at a temperature sufficiently elevated and at a pressure sufficient to remove at least a portion of Group VA metal halide from the first intercalate composition, and

(3) contacting said intercalate composition from which Group VA metal halide has been at least partially removed with aluminum halide at a temperature below the decomposition temperature of the aluminum halide and pressure sufficient to form a second intercalated structure comprising aluminum halide, graphite, and a Group VA metal halide present in a molar ratio of Group VA metal halide to aluminum halide of about 1.4:1 to 0:1.

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**4,110,253**

## METHOD FOR THE DISPROPORTIONATION OF HIGHLY ALKYLATED PHENOLS WITH PHENOL

**Bruce E. Leach, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.**

**Filed Jan. 24, 1977, Ser. No. 762,083**

**Int. Cl.[2] B01J** *29/00*

**U.S. Cl. 252—457** **3 Claims**

1. An improved catalyst for phenolic disproportionation and methylation comprising adding to a magnesium oxide base catalyst from about 0.5 to about 15% by weight of tungsten oxide, from about 1 to about 5% by weight of $SiO_2$:$XH_2O$, and from about 1 to about 5% by weight of $Na_2SiO_3$, based on the total weight of the final catalyst.

3. A catalyst as described in claim 1 wherein about 5 weight percent tungsten oxide, 3 weight percent sodium silicate and about 3 weight percent silica sol are present.

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**4,110,254**

## METAL OXIDE CATALYTIC COMPOSITIONS

**Alan Lauder, Newark, Del., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 463,985, Apr. 25, 1974, abandoned. This application Jun. 3, 1976, Ser. No. 692,500**

**Int. Cl.[2] B01J** *21/04, 23/10, 23/58, 23/64*

**U.S. Cl. 252—462** **17 Claims**

1. Catalytic compounds having the perovskite-type $ABO_3$ crystal structure wherein the Type A cation sites are substantially fully occupied by ions of one metal having an atomic number of 11 to 51, 57 to 71, or 89 to 103; about 1 to 20% of the Type B cation sites are occupied by ions of at least one platinum group metal selected from ruthenium, osmium, rhodium, iridium, palladium, and platinum and the remainder of the Type B cation sites are occupied by ions of at least one nonplatinum group metal having an ionic radius between 0.4 and 1.4 Angstroms, and wherein a major portion of the nonplatinum group B site metals have a single fixed valence of three.

4,110,255

## BEVERAGE CARBONATION DEVICE

Alexander L. Liepa, Wyoming, and Cornelis H. Japikse, Springfield Township, Hamilton County, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Division of Ser. No. 489,292, Jul. 7, 1974, Pat. No. 4,007,134, which is a continuation-in-part of Ser. No. 445,200, Feb. 25, 1974, abandoned. This application Nov. 8, 1976, Ser. No. 739,663

Int. Cl.[2] B01J *29/06*

U.S. Cl. 252—455 Z 26 Claims

1. A rigid composite body comprising crystalline zeolite molecular sieves in an amount of at least 40% of the body weight, said body having a surface area to mass ratio of from about 4 $cm^2/g$. to about 200 $cm^2/g$. and having at least 6 g. of crystalline zeolite molecular sieves distributed substantially uniformly throughout said body wherein said body has adsorbed therein a releasable amount of carbon dioxide which is sufficient to carbonate an aqueous beverage when said body is immersed therein, and; wherein said body has a plurality of substantially parallel elongated channels extending from one surface of said body to the interior of said body with the longitudinal axis of said elongated channels substantially parallel to the axis of the vertical dimension of said body.

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4,110,256

## CATALYST FOR REFORMING FUEL AND METHOD FOR PRODUCING SAME

Yukihisa Takeuchi, Aichi, and Masao Wakayama, Okazaki, both of Japan, assignors to Nippon Soken, Inc., Japan

Filed Jun. 10, 1977, Ser. No. 805,439

Claims priority, application Japan, Jun. 22, 1976, 51-73718; Jul. 15, 1976, 51-84234

Int. Cl.[2] B01J *21/04, 23/72, 23/86*

U.S. Cl. 252—465 16 Claims

1. A catalyst for reforming a fuel, comprising a catalyst carrier consisting essentially of $\gamma$-$Al_2O_3$ and a catalyst metal mixture containing Cu, Ni and Cr supported on said carrier, said catalyst metal mixture having the following composition:

Cu = 36–62% by weight,

Ni = 8–32% by weight, and

Cr = 18–41% by weight,

provided that Cu + Ni + Cr = 100% by weight.

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4,110,257

## RANEY NICKEL CATALYTIC DEVICE

Stephen A. O'Hare, Vienna, Va., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jul. 1, 1977, Ser. No. 812,303

Int. Cl.[2] B01J *21/04, 23/74*

U.S. Cl. 252—466 J 6 Claims

1. The method of making a tubular-shaped catalytic device comprising:

(a) inserting a tubular-shaped catalytic element into a tubular-shaped substrate, and

(b) heat-treating the resulting composite to cause the tubular-shaped catalytic element to irreversibly expand and become secured to the inside surface of said substrate.

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4,110,258

## BARIUM METAL OXIDE CATALYTIC COMPOSITIONS

Alan Lauder, Newark, Del., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.

Continuation of Ser. No. 463,986, Apr. 25, 1974, abandoned. This application May 14, 1976, Ser. No. 686,640

Int. Cl.[2] B01J *21/04, 23/58, 23/62, 23/64*

U.S. Cl. 252—468 14 Claims

1. Catalytic compounds having perovskite-type $ABO_3$ crystal structure wherein the sites of Type A are substantially fully occupied by barium ions; about 1% to 20% of the Type B cation sites are occupied by ions of at least one platinum group metal selected from ruthenium, osmium, rhodium, iridium, palladium, and platinum; and the remainder of the Type B cation sites are occupied by ions of at least one nonplatinum group metal having a single fixed valence of three and an ionic radius between 0.4 and 1.4 Angstroms.

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4,110,259

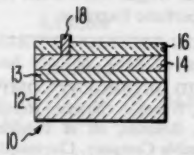
## ELECTROCHROMIC CERMET MATERIAL AND DEVICE INCLUDING THE SAME

Enid Keil Sichel, East Windsor, N.J., assignor to RCA Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 783,653, Apr. 1, 1977. This application Jun. 15, 1977, Ser. No. 806,716

Int. Cl.[2] H01B *1/02*

U.S. Cl. 252—514 18 Claims




1. An electrochromic cermet material, which consisting essentially of

an electrically insulating electrochromic material, and

particles of a noble metal which are greater than about 10Å in diameter.

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4,110,260

## ELECTROCONDUCTIVE COMPOSITE CERAMICS

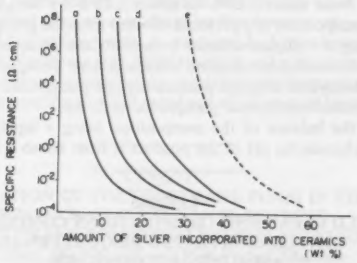
Hirotaka Yamamoto; Satoshi Sendai, and Hideaki Ninomiya, all of Tokyo, Japan, assignors to Tokyo Denki Kagaku Kogyo Kabushiki Kaisha (TDK Electronics Co., Ltd.), Tokyo, Japan

Filed Sep. 22, 1976, Ser. No. 725,457

Claims priority, application Japan, Sep. 25, 1975, 50/115904; Jun. 11, 1976, 51/68307

Int. Cl.[2] H01B *1/08*

U.S. Cl. 252—519 17 Claims




1. Electroconductive composite ceramics composed of (A) 50–98% by weight of an independent phase which is conglomerates having a particle diameter of at least 20$\mu$ and consisting essentially of insulating or semiconductive ceramics having a high melting point or a mixture thereof selected from the group consisting of alumina, magnesia, spinel and zirconia and (B) 50–2% by weight of a continuous phase which is at least one electroconductive substance and connects said independent phase mutually selected from the group consisting of metals, carbon, cermets, nitrides, borides, carbides and silicides of metals, and metal oxides.

4,110,261

## FRAGRANCE-EMITTING ARTICLE HAVING A POLYMER-PETROLEUM WAX COMPOSITION

John W. Newland, Hamburg, N.Y., assignor to W & F Mfg. Co., Inc., Buffalo, N.Y.

Continuation-in-part of Ser. No. 614,493, Sep. 18, 1975, abandoned. This application Mar. 18, 1977, Ser. No. 779,245

Int. Cl.[2] A61K *7/46;* C11B *9/00;* C10L *5/00*

U.S. Cl. 252—522 2 Claims

1. A fragrance-emitting article having a composition, suitable for flush molding, comprising essentially about 75% by weight of petroleum wax; about 10% by weight of polymer selected from the group which consists of ethylene vinyl acetate, ethylene vinyl acetate acid terpolymer, ethylene ethyl acrylate, ethylene isobutyl acrylate, polyethylene and polypropylene, each of such members of said group having a weight average molecular weight below about 10,000; and about 15% by weight of a perfume fragrance.

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4,110,262

## LIQUID DETERGENT COMPOSITION

José Luis Arnau, Wemmel; Christian Roland Barrat, Meise, and Jean Wevers, Brussels, all of Belgium, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Mar. 7, 1977, Ser. No. 775,214

Claims priority, application United Kingdom, Mar. 8, 1976, 09257/76

Int. Cl.[2] C11D *1/825, 1/831, 7/50*

U.S. Cl. 252—545 4 Claims

1. A liquid, concentrated homogenous stable heavy duty liquid detergent comprising:

(a) from about 20% to about 70% by weight of the composition of a soluble ethoxylated nonionic surfactant selected from the group consisting of ethoxylated alcohols containing from about 2 to about 24 moles of ethylene oxide wherein the alcohol is selected from the group consisting of:

(i) straight and branched chain primary and secondary, saturated and unsaturated, aliphatic alcohols having from about 8 to about 24 carbon atoms in the hydrocarbyl group thereof, and

(ii) alkyl phenols wherein the alkyl group or groups have from about 1 to about 12 carbon atoms, wherein at least one alkyl group has at least 6 carbon atoms and wherein the total number of carbon atoms in the alkyl groups is at most about 15; and mixtures thereof;

(b) from about 0.10% to about 1.25% by weight of the composition of a polyacid selected from the group consisting of : ethylenediamine tetramethylene phosphonic acid, hexamethylene diamine tetramethylene phosphonic acid, diethylene triamine pentamethylene phosphonic acid and aminotrimethylene phosphonic acid; and

(c) the balance of the composition being a liquid carrier; wherein the pH of the product is from 6.0 to 7.5.

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4,110,263

## MILD CLEANSING COMPOSITIONS CONTAINING ALKYLENEOXYLATED BISQUATERNARY AMMONIUM COMPOUNDS

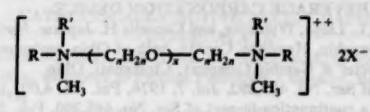
Martin K. O. Lindemann, Freehold; Robert R. Kennedy, Parlin, and Robert J. Verdicchio, Succasunna, all of N.J., assignors to Johnson & Johnson Baby Products Company, New Brunswick, N.J.

Filed Jun. 17, 1977, Ser. No. 807,768

Int. Cl.[2] C11D *1/94, 1/65, 1/62*

U.S. Cl. 252—545 15 Claims

15. A method for reducing ocular irritancy in cosmetic cleansing compositions containing anionic or amphoteric detergents which comprises adding to the detergent composition an alkyleneoxylated bisquaternary ammonium compound represented by the formula



wherein R is an aliphatic radical of from about 10 to about 26 carbon atoms, R' is methyl, ethyl, propyl or R, X is an anion, *n* is 2 or 3, and *x* is an integer of from 1 to about 30;

wherein said alkyleneoxylated bisquaternary ammonium compound is added in an amount sufficient to provide a weight ratio of bisquaternary ammonium compound to detergent of from 0.1:1 to about 0.3:1.

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4,110,264

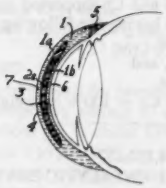
## PERMEABLE POLYMETHYLMETHACRYLATE CONTACT LENS

Charles W. Neefe, P. O. Box 429, Big Spring, Tex. 79720

Continuation-in-part of Ser. No. 737,045, Oct. 29, 1976, abandoned, which is a continuation-in-part of Ser. No. 663,095, Mar. 2, 1976, abandoned, which is a continuation-in-part of Ser. No. 579,796, May 22, 1976, Pat. No. 3,957,049, which is a continuation-in-part of Ser. No. 404,352, Oct. 9, 1973, abandoned, which is a continuation-in-part of Ser. No. 233,408, Mar. 10, 1972, Pat. No. 3,786,812, which is a continuation-in-part of Ser. No. 562,022, May 16, 1966, abandoned. This application Nov. 9, 1977, Ser. No. 849,764

Int. Cl.[2] C08J *9/26*

U.S. Cl. 521—63 5 Claims




1. A permeable contact lens concave-convex in form of an optically clear material made by the steps of adding to monomeric methylmethacrylate 2% to 40% by weight of a soluble material which does not react with monomeric methyl methacrylate during polymerization, polymerizing the methyl methacrylate solution to form a solid mass and extracting said soluble material from the solid polymethyl methacrylate.

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4,110,265

## ION EXCHANGE MEMBRANES BASED UPON POLYPHENYLENE SULFIDE

Russell B. Hodgdon, Sudbury, Mass., assignor to Ionics Inc., Watertown, Mass.

Filed Mar. 1, 1977, Ser. No. 773,371

Int. Cl.[2] C08G *75/14;* C08F *28/00, 8/36*

U.S. Cl. 521—30 4 Claims

1. A method of preparing a cross-linked, substantially insoluble cation exchange polyelectrolyte resin having improved stability to oxidation comprising reacting polyphenylene sulfide with oleum containing between about 10 to 65% by weight of sulfur trioxide.

4,110,266

## PROCESS FOR CONVERTING THE DECOMPOSITION PRODUCTS OF POLYURETHANE AND NOVEL COMPOSITIONS THEREBY OBTAINED

Martin B. Sheratte, Canoga Park, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Jul. 9, 1976, Ser. No. 703,807
Int. Cl.[2] C08J *11/00*; C08G *18/00*
U.S. Cl. 260—2.3 33 Claims

1. A process for decomposing polyurethane and converting the depolymerized decomposition mixture into a product substantially free of primary and secondary amines and containing an increased amount of polyols suitable for reaction with polyisocyanate for producing fresh polyurethane foam, which comprises reacting a polyurethane foam with a decomposing agent at elevated temperature, and forming a depolymerized decomposition mixture containing polyols, ureas and a member selected from the group consisting of primary and secondary amines, and mixtures thereof, and reacting said decomposition mixture with alkylene oxide, employing an excess of alkylene oxide with respect to active hydrogen atoms of the amines, at elevated temperature ranging from about 100° to about 180° C and at elevated pressure, for a period sufficient to convert said amines to polyols, and forming a product mixture having an increased amount of polyols, as compared to said decomposition mixture, and substantially free of primary and secondary amines.

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4,110,267

## EXPANDABLE ETHYLENICALLY UNSATURATED POLYMER PARTICLE COMPOSITIONS

Toshiki Ikeda, and Yoshitsugu Beppu, both of Shiga, Japan, assignors to Sekisui Kaseihin Kogyo Kabushiki Kaisha, Nara, Japan

Filed Jul. 17, 1975, Ser. No. 596,854
Claims priority, application Japan, Aug. 23, 1974, 49-97282; Oct. 19, 1974, 49-120560
Int. Cl.[2] C08J *9/00*
U.S. Cl. 521—57 16 Claims

1. Expandable ethylenically unsaturated polymer particle compositions which can be pre-expanded and molded to form cellular shaped articles, which comprises ethylenically unsaturated polymer particles containing an expanding agent, said particles having the surfaces thereof coated with a layer of a compound comprising calcium carbonate, said compound having a particle size of from 0.02 to 0.2 microns and the surfaces of said calcium carbonate particles having chemically attached thereto an organic compound selected from the group consisting of higher fatty acids, resin acid, lignin sulfonic acid and alkaline metal salts thereof and mixtures thereof, said organic compound being present in an amount of from 0.5 to 6 parts by weight per 100 parts by weight of calcium carbonate, and said calcium carbonate compound being present in the amount of from 0.005% to 0.3% by weight of said polymer particles, whereby said polymer particles are substantially free of lumping or agglomerating during pre-expansion and are capable of being easily fused when molded.

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4,110,268

## POLYETHER POLYOLS AND POLYURETHANE FOAMS MADE THEREFROM

Kermit D. Longley, Park Forest, Ill.; Robert Herke, Missouri City, Tex., and Robert J. Kufrin, Hinsdale, Ill., assignors to Witco Chemical Corporation, New York, N.Y.

Filed Sep. 27, 1976, Ser. No. 726,861
Int. Cl.[2] C08G *18/14*; C07C *41/12*; C09K *3/00*
U.S. Cl. 521—177 24 Claims

1. In that process for the preparation of normally liquid polyether polyols which are useful in the production of polyurethane foams, and wherein a di- or polyhydric alcohol is reacted with an alkylene oxide or α-epoxide in the presence of a basic catalyst, the improvement which comprises, after completion of the reaction to produce the polyether polyol, and without otherwise removing said basic catalyst, neutralizing said basic catalyst with at least one member of the group consisting of oleic acid and tall oil fatty acids alone, or in conjunction with a sulfonic acid which is a higher molecular weight alkylbenzene or alkyltoluene, or a butyl- or amylnaphthalene, sulfonic acid.

17. A polyurethane foam composition comprising the reaction product of an organic polyisocyanate and a normally liquid polyether polyol, said polyether polyol being the neutralization product resulting from the neutralization of a basic catalyst, previously used in and unremoved from the preparation of said polyether polyol, with oleic acid or tall oil fatty acids alone or in conjunction with a sulfonic acid which is a higher molecular weight alkylbenzene or alkyltoluene sulfonic acid, or a butyl- or amylnaphthalene sulfonic acid.

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4,110,269

## METHOD OF MAKING POLYETHYLENE FOAM

Herbert A. Ehrenfruend, Madison, Conn., assignor to Olefoam Corporation, Madison, Conn.

Filed Jan. 31, 1977, Ser. No. 764,181
Int. Cl.[2] C08J *9/14*
U.S. Cl. 521—81 4 Claims

1. A method of producing a low density polyethylene foam comprising charging an extruder with a polyethylene resin, from about 5% to 30% by weight of an ionomer resin selected from the group consisting of ionically crosslinked copolymers of ethylene/methacrylic acid and ethylene/vinyl acetate, and a nucleating agent, heating said charge so as to melt said resins, injecting an expanding agent mixture consisting of dichlorodifluoromethane and dichlorotetrafluoroethane into said melt charge in an amount of 8% or less by weight and said mixture comprises approximately a 2:1 ratio of dichlorotetrafluoroethane to dichlorodifluorourethane and extruding said melt charge to form said foam.

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4,110,270

## PROCESS FOR THE PREPARATION OF FOAMS CHARACTERIZED BY ISOCYANURATE AND URETHANE LINKAGES

Thirumurti Narayan, Riverview, Mich., assignor to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed May 5, 1977, Ser. No. 794,174
Int. Cl.[2] C08G *18/22, 18/14, 18/48*
U.S. Cl. 521—121 8 Claims

1. In a process for the preparation of a pour-in-place urethane-modified isocyanurate foam by the reaction of an organic polyisocyanate with a primary hydroxyterminated polyol in the presence of a blowing agent and a trimerization catalyst the improvement which comprises employing as catalyst for the reaction an alkali metal salt of toluene- or benzenesulfinic acid.

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4,110,271

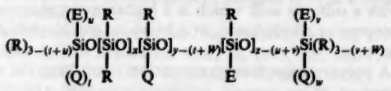
## FORMATION OF POLYURETHANE FOAM IN THE PRESENCE OF SULFOLANYL-BEARING POLYSILOXANE-POLYOXYALKYLENE POLYMERS

Bernard Kanner, West Nyack, and Bela Prokai, Mahopac, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

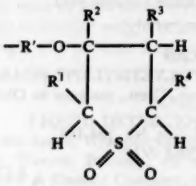
Division of Ser. No. 592,129, Jun. 30, 1975, Pat. No. 4,049,674. This application May 26, 1977, Ser. No. 800,891
Int. Cl.[2] C08K *5/54*; C08G *18/42, 18/48*
U.S. Cl. 521—111 10 Claims

1. A process for producing polyurethane foam which comprises reacting and foaming a reaction mixture containing: (a) an organic polyol reactant comprising a polyether polyol or a polyester polyol having an average of at least two hydroxyl groups per molecule; (b) an organic polyisocyanate reactant having at least two isocyanato groups per molecule; (c) a blowing agent; (d) a catalyst comprising an amine; and (e) a

foam stabilizer comprising a polysiloxanepolyoxyalkylene copolymer having the average composition,



wherein: R is alkyl having from one to ten carbon atoms; each of $t$, $u$, $v$, $w$, the sum $t+u$ and the sum $v+w$ is independently zero or one, and each of the sums $t+w$ and $u+v$ is independently zero, one or two; Q is a sulfolanyloxyalkyl group having the formula,



where —R'— is a bivalent alkylene group having from two to eight carbon atoms, and $R^1$, $R^2$, $R^3$ and $R^4$ are independently hydrogen or alkyl having from one to four carbon atoms;

and, when reactant (a) comprises a polyether polyol, $x$ has an average value from about 10 to about 200, $y$ has an average value from about 2 to about 100, $z$ has an average value from about 2 to about 30, and E is a polyoxyalkylene block the average polyoxyalkylene content of which is constituted of from about 20 to about 75 weight percent of oxyethylene units; and, when reactant (a) comprises a polyester polyol, $x$ is zero or a positive number having an average value up to about 20, $y$ has an average value from about 2 to about 20, $z$ has an average value from about 2 to about 30, and E is a polyoxyalkylene block the average polyoxyalkylene content of which is constituted of at least 75 weight percent oxyethylene units.

2. A process as defined in claim 1 in which said reaction mixture contains an organic flame-retardant as an additional component thereof.

3. A flame-retardant-containing flexible polyurethane foam produced by the process of claim 2.

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**4,110,272**

## FORMATION OF HIGH-RESILIENCE URETHANE FOAM IN THE PRESENCE OF SULFOLANYLOXY ALKYL-POLYALKYLSILOXANES

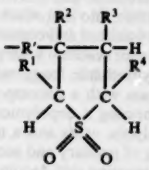
**Bernard Kanner, West Nyack, and Bela Prokai, Mahopac, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.**

**Division of Ser. No. 592,128, Jun. 30, 1975, Pat. No. 4,049,675. This application Jul. 12, 1977, Ser. No. 815,010**

**Int. Cl.² C08G *18/14***

**U.S. Cl. 521—111** **16 Claims**

1. A method for producing polyurethane foam which comprises reacting and foaming a reaction mixture containing (1) an organic polyol reactant comprising a polyether polyol having an average hydroxyl functionality from 2.1 to about 5 and an average primary hydroxyl content from about 35 to about 90 mole percent, based on the total moles of hydroxyl groups contained in the polyether polyol, 2) an organic polyisocyanate (3) a tertiary-amine catalyst, (4) a blowing agent, and (5) a surfactant component comprising a sulfolanyloxyalkyl-polyalkylsiloxane consisting essentially of (a) monofunctional siloxy units, M°, the respective silicon atoms of which have two alkyls bonded thereto, the third silicon-bonded organic group being alkyl or sulfolanyloxyalkyl, (b) an average from about 0.5 to about 10 moles of difunctional dialkylsiloxy units for every two moles of M°, and (c) from 0 up to an average of about 10 moles, for every two moles of M°, of difunctional monoalkylsiloxy units in which the second organic group bonded to silicon is sulfolanyloxyalkyl, provided the said sulfolanyloxyalkyl-polyalkylsiloxane contains an average of at least about 0.5 and no more than about 10 moles of sulfolanyloxyalkyl groups for every two moles of M°, and wherein the silicon-bonded alkyls have from one to four carbon atoms and the silicon-bonded sulfolanyloxyalkyl groups have the formula,



where R' is bivalent alkylene having from two to eight carbon atoms, and $R^1$, $R^2$, $R^3$ and $R^4$ are independently hydrogen or alkyl having from one to four carbon atoms.

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**4,110,273**

## BLOWING AGENT MIXTURE

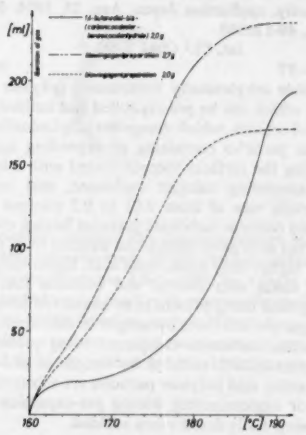
**Wolfgang Cohnen, Leverkusen, and Gerhard Apel, Krefeld, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Division of Ser. No. 606,913, Aug. 22, 1975. This application Sep. 12, 1977, Ser. No. 832,307**

**Claims priority, application Fed. Rep. of Germany, Aug. 29, 1974, 2441418**

**Int. Cl.² C08J *9/08***

**U.S. Cl. 521—59** **2 Claims**




1. A process for the production of foams from thermoplastic resins comprising

(A) mixing

(i) granules of a thermoplastic resin selected from the group consisting of a polycarbonate, a polyamide, a polyester and a thermoplastic composition of polyphenylene ether and impact resistant polystyrene, with

(ii) 0.1 to 15% by weight based on the weight of the total mixture of a blowing agent mixture comprising

(a) 85 to 60 wt.% of 1,4-butane diol-bis-(carbonic acid ester benzoic acid anhydride), and

(b) 15 to 40 wt.% of silicon dioxide having a surface area according to B.E.T. of from 50 to 400 $m^2/g$ and a water loss at 1000° C. for 2 hours of less than 2.5% by weight, and

(B) heating the mixture of (A) to a temperature of 160° to 300° C.

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4,110,274

## METHOD FOR MAKING CROSSLINKED RESIN FOAMS FROM AN ETHYLENICALLY UNSATURATED DICARBOXYLIC ACID ANHYDRIDE AND A POLYISOCYANATE

John M. Corbett, Newark, and Frederick J. Dechow, Thornville, both of Ohio, assignors to The Dow Chemical Company, Midland, Mich.

Filed Oct. 17, 1977, Ser. No. 842,720
Int. Cl.[2] C08J 9/00, 9/08
U.S. Cl. 521—157 10 Claims

1. A method for making crosslinked ethylenic resin foams which comprises admixing and inter-reacting in a reaction mixture at least one ethylenically unsaturated dicarboxylic acid anhydride having the general formula:

wherein A is a divalent radical containing ethylenic unsaturation and having the carbonyl groups attached to vicinal carbon atoms, at least one polyisocyanate having the general formula:

$$R-(NCO)_x$$

wherein R is an organic radical having at least 4 carbon atoms and its valence bonds on different carbon atoms and $x$ is a small number at least 2, and water, in proportions of from about 0.6 to about 2 equivalents of polyisocyanate per mole of anhydride and from about 0.6 to about 2 moles of water per mole of anhydride, at reaction temperature below about 150° C. to form a flowable reaction mixture, subsequently admixing a foam-stabilizing amount of surfactant into the resulting flowable reaction mixture and completing the resin-forming and foaming reactions by heating the reaction mixture at temperatures above about 150° C. to form a cellular resin body having apparent density less than about 30 pounds per cubic foot.

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4,110,275

## CONTROL OF INCOMPETENT FORMATIONS WITH THICKENED ACID-SETTABLE RESIN COMPOSITIONS

Thomas R. Sifferman, and Derry D. Sparlin, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Division of Ser. No. 739,216, Nov. 5, 1976, Pat. No. 4,085,801. This application Jul. 14, 1977, Ser. No. 815,623
Int. Cl.[2] C08L 1/16; E21B 33/13
U.S. Cl. 260—14 10 Claims

1. A composition for positioning an acid-settable polymeric material having particulate matter disposed therein in contact with a subterranean formation penetrated by a wellbore, said composition consisting essentially of:

(a) a substantially neutral hydrocarbon oil;

(b) a quaternary ammonium salt of cellulose sulfate, the quaternary ammonium group of said quaternary salt of cellulose sulfate containing at least 16 carbon atoms and being present in said composition in an amount sufficient to produce a minimum apparent viscosity in said composition of at least 50 cps, but less than 5000 cps at the injection temperature and pressure and an apparent minimum viscosity at bottom hole conditions of at least 25 cps;

(c) finely-divided solid particulate material in an amount equal to from about 0.25 to about 22 pounds of particulate matter per gallon of said oil; and,

(d) an acid-settable liquid thermosetting resin in an amount equal to from about 0.1 to about 5.0 gallons per $ft^3$ of said particulate material.

4,110,276

## POLYESTER FOAM MATERIALS

Thomas A. DesMarais, Norwood, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 737,930, Nov. 2, 1976, abandoned. This application Oct. 19, 1977, Ser. No. 843,606
Int. Cl.[2] C08J 9/00
U.S. Cl. 521—123 30 Claims

1. A stable, resilient polyester foam comprising a three-dimensional condensate of:

(a) at least one polyol having at least two hydroxyl groups and an equivalent weight of at least about 1,000;

(b) at least one propylene oxide-based polyhydroxy crosslinking agent having at least three hydroxyl groups and an equivalent weight of less than about 250 said equivalent weight based hydroxy groups; and

(c) at least one acyl halide having at least two —COX radicals wherein X is a halogen atom.

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4,110,277

## NYLON MODIFIED PHENOLIC RESIN FIBERS

James Economy, Eggertsville; Francis J. Frechette, Tonawanda, and Luis C. Wohrer, Lewiston, all of N.Y., assignors to The Carborundum Company, Niagara Falls, N.Y.

Continuation of Ser. No. 149,046, Jun. 1, 1971, abandoned. This application Feb. 9, 1977, Ser. No. 767,005
Int. Cl.[2] C08L 61/10, 77/10, 77/04
U.S. Cl. 260—841 18 Claims

1. A fiber produced by melt spinning and consisting essentially of a homogeneous physical mixture of an uncured phenolic resin and from about 5% to about 30% of an aliphatic nylon, said phenolic resin being a condensation product of a phenol and an aldehyde selected from the group consisting of formaldehyde and paraformaldehyde.

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4,110,278

## MANUFACTURE OF MOLDING COMPOSITIONS BASED ON UNSATURATED POLYESTER RESINS

Kurt Demmler, Ludwigshafen; Horst Lawonn, Limburgerhof, and Anton Hesse, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Nov. 11, 1975, Ser. No. 631,195
Claims priority, application Fed. Rep. of Germany, Nov. 19, 1974, 2454773
Int. Cl.[2] C08K 3/28; C08L 1/00, 67/06
U.S. Cl. 260—17 A 5 Claims

1. In an unsaturated polyester molding composition which is curable in the presence of polymerization initiators and which composition includes a mixture of

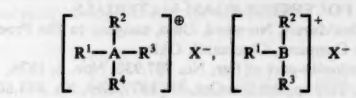
(a) an unsaturated polyester,

(b) at least one copolymerizable olefinic monomeric compound,

(c) an alkaline earth metal oxide or hydroxide selected from the group consisting of calcium oxide, calcium hydroxide, magnesium oxide, magnesium hydroxide and mixtures thereof, and an

(d) inhibitor selected from the group consisting of hydroquinone, tert.-butyl pyrocatechol, p-benzoquinone, chloranil, nitrobenzenes, thiodiphenylamine, salts of N-nitroso-N-cyclohexylhydroxylamine and mixtures thereof;

the improvements comprising a composition wherein the content of component (c) is from 0.5 to 5 percent by weight based on the mixture of components (a) and (b), and said composition contains from 0.1 to 2 percent by weight, based on the mixture of components (a) and (b) of an onium salt selected from the group consisting of the formula



and mixtures thereof where A is selected from the group consisting of nitrogen, phosphorus, arsenic and antimony; B is selected from the group consisting of oxygen, sulfur and selenium; $R^1$, $R^2$, $R^3$ and $R^4$ are, each independently, selected from the group consisting of hydrogen, unsubstituted alkyl, unsubstituted aryl, substituted alkyl and substituted aryl, wherein at least one of $R^1$ to $R^4$is selected from the group consisting of unsubstituted alkyl, unsubstituted aryl, substituted alkyl and substituted aryl; two of $R^1$ to $R^4$ are linked to form a heterocyclic ring which contains from 5 to 7 ring members which are unsubstituted or substituted; $X^-$ is selected from the group consisting of $F\ominus$, $Cl\ominus$, $Br\ominus$, $I\ominus$and $SCN\ominus$; or such onium salt groups are built into a polymer molecule via one of $R^1$ to $R^4$.

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**4,110,279**

## HIGH TEMPERATURE POLYMERS FROM METHOXY FUNCTIONAL ETHER AROMATIC MONOMERS

**Donald L. Nelson, Lake Jackson, Tex., and Norman T. Herbert, Bay City, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Continuation-in-part of Ser. No. 445,513, Feb. 25, 1974. This application Feb. 3, 1977, Ser. No. 765,143**

**Int. Cl.[2] C08L *91/00*; C08G *16/02***

**U.S. Cl. 260—19 R** **18 Claims**

1. A polymer derived by heating in the presence of an acid catalyst at between about 65° C and 260° C

I. a cogeneric mixture of alkoxy functional compounds, having an average equivalent weight in the range from about 220 to about 1200, obtained by heating together in the presence of a strong acid at about 50° C to about 250° C;

(A) a diaryl compound selected from naphthalene, diphenyl oxide, diphenyl sulfide, their alkylated or halogenated derivatives or mixtures thereof,

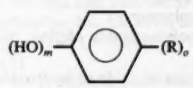
(B) formaldehyde or formaldehyde-yielding derivative,

(C) water, and

(D) a hydroxy aliphatic hydrocarbon compound having at least one free hydroxyl group and from 1 to 4 carbon atoms,

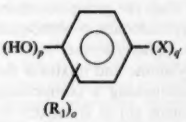
which mixture contains 0 to 50 percent by weight unreacted (A); with

II. up to one monomeric phenolic reactant per equivalent of I selected from the group



(i)

wherein R is selected from the group consisting of



(ii)

hydrogen, alkyl radical of 1 to 20 carbon atoms, aryl radical of 6 to 20 carbon atoms, $R_1$ represents hydrogen, alkyl or aryl, *m* represents an integer from 1 to 3, o represents an integer from 1 to 5; p represents an integer from 0 to 3; X represents oxygen, sulfur or $C_1$ to $C_3$ alkylidene; and, *q'* represents an integer from 0 to 1.

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**4,110,280**

## METHOD FOR PREPARING EXTRUDED FASTENERS

**William C. Hedges, Hampton, N.J., assignor to Star Manufacturing Company of Oklahoma, Oklahoma City, Okla.**

**Filed Jan. 19, 1976, Ser. No. 649,963**

**Int. Cl.[2] B29G *2/02***

**U.S. Cl. 264—22** **8 Claims**

1. A method for forming tongue and groove fastener components comprising the steps of:

(a) mixing together rubbery, chlorosulfonated polyethylene, at least one stable polymer extender, at least one fire retardant compound and at least one processing aid compound to form a blend; and

(b) thereafter extruding said blend to form said fastener components.

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**4,110,281**

## PROCESS FOR THE MANUFACTURE OF FILLERS FROM SOLID WASTE

**Gottfried Dreer, Krawehlstrasse 34, 4300 Essen, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 674,431, Apr. 7, 1976, abandoned, and a continuation-in-part of Ser. No. 597,120, Jul. 18, 1975, abandoned, and a continuation-in-part of Ser. No. 593,386, Jul. 7, 1975, abandoned, and a continuation-in-part of Ser. No. 550,585, Feb. 18, 1975, Pat. No. 4,012,231. This application Mar. 14, 1977, Ser. No. 777,431**

**Claims priority, application Fed. Rep. of Germany, Feb. 15, 1974, 2407383; Jul. 6, 1974, 2432606; Jul. 18, 1974, 2434487; Apr. 8, 1975, 2515179**

**Int. Cl.[2] C04B *31/40*; C09D *3/66, 5/18***

**U.S. Cl. 260—22 A** **15 Claims**

1. A process for producing a compost which comprises grounding municipal waste, magnetically freeing from iron contained therein, separating said mixture into components of various sizes by fractionation and, treating said mixture in a tank in a fermentation process at a temperature of about 65° C. by continuously passing air thereto and mixing a solvent with said mixture and heating said tank until the contents of the tank are dried, thereby forming a compost.

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**4,110,282**

## PROCESS FOR PREPARING A COLD-SET LACQUER

**Dietrich Pirck, Seevetal, and Gündolf Fuchs, Hemmingstedt, both of Fed. Rep. of Germany, assignors to Deutsche Texaco Aktiengesellschaft, Hamburg, Fed. Rep. of Germany**

**Filed Feb. 28, 1977, Ser. No. 772,878**

**Claims priority, application Fed. Rep. of Germany, Mar. 2, 1976, 2608579**

**Int. Cl.[2] C09D *3/81***

**U.S. Cl. 260—23 AR** **16 Claims**

1. The process for preparing a cold-set lacquer for a glossy, water-proof coating which comprises

forming a reaction mixture containing an aqueous emulsion including (i) 1–30 parts of emulsifier, (ii) 100–1000 parts of acrylate monomers, and (iii) 1–100 parts of cold-cross-linkable co-monomers;

adding 0.5–5 parts of polymerization initiator to said reaction mixture and heating to about 75° C.;

adding to said mixture, at a temperature of from about 75° to 80° C., an aqueous pre-emulsion including further (i) emulsifier, (ii) acrylate monomers, and (iii) cold-cross-linkable co-monomers;

a total of 1 to 10 percent by weight of cold-cross-linkable co-monomers, based on the total amount of acrylate monomers, being employed;

and further polymerization initiator;

and adding after completion of polymerization to the resultant polymer dispersion from 3 to 15 percent by weight,

based on the solids content of the polymer dispersion, of a polyaminoamide colloidally soluble in water.

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## 4,110,283
## CRYSTALLIZATION INHIBITOR FOR PARAFFIN

**Anthony Capelle, Stad-Delden, Netherlands, assignor to Chemische Fabriek Servo B.V., Delden, Netherlands**

**Filed May 10, 1977, Ser. No. 795,633**
**Int. Cl.[2] C09K *3/00***
**U.S. Cl. 260—23 AR** **8 Claims**

1. A crystallization inhibitor for paraffin, which contains as the active component a copolymer of 4-vinyl pyridine with esters of alcohols having at least 10 carbon atoms and acrylic acid in a mole ratio between 5:1 and 1:20 and having a molecular weight not greater than 100,000, wherein the agent consists essentially of an aqueous emulsion containing

(a) the copolymer or a solution thereof in a hydrocarbon, said copolymer being present in an amount sufficient to inhibit crystallization of paraffin in petroleum;

(b) a mixture of water with an organic solvent, which mixture has a freezing point of at most −15° C.;

(c) a mixture of (1) an ethoxylated fatty acid emulsifier having 10–24 carbon atoms in the fatty acid radical and 4–22 ethoxyl groups, and (2) an alkylol amide emulsifier obtained by condensing fatty acids having 10–24 carbon atoms with 1–2 moles of a dialkylol amine having 2–4 carbon atoms per alkylol group, said emulsifiers being present in admixture in an amount sufficient to provide an emulsion at freezing to room temperatures; and

(d) as neutralizing agent an amount sufficient of fatty acids from tall oil to neutralize the mixture.

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## 4,110,284
## POLYURETHANE LATEXES FROM SULFONATE PREPOLYMER, AQUEOUS CHAIN EXTENSION PROCESS, AND COATED SUPPORT

**Robert Violland, and Jean Neel, both of Lyons, France, assignors to Rhone-Progil, Courbevoie, France**

**Filed Oct. 11, 1974, Ser. No. 514,151**
**Claims priority, application France, Oct. 12, 1973, 73 37140**
**Int. Cl.[2] C08L *75/08;* C08G *71/02***
**U.S. Cl. 260—29.2 TN** **14 Claims**

1. A process for preparing an auto-emulsified, highly disperse, film-forming and storage stable anionic polyurethane latex comprising charging an auto-emulsified and water propagable isocyanato chain terminated, anionic polyurethane prepolymer into an aqueous medium, and thence agitating the resulting dispersion to auto-emulsify and chain propagate said prepolymer, said prepolymer having a molecular weight between about 2000 and 10,000 and being formed from the reaction of at least:

(a) a member selected from the group consisting of an anionic sulfonated polyester, an anionic sulfonated polyether and admixtures thereof, having a molecular weight between about 1000 and 4000 and a sulfur content between about 0.5 and 3% by weight, wherein said polyester is prepared by condensing at least:

(i) a dicarboxylic acid or its lower alkyl diester

(ii) a polyol

(iii) and a sulfonated diacid, its sulfonated diester or the alkali metal salt thereof, said diacid being selected from the group consisting of isosulfophthalic and sulfosuccinic acid, and wherein said polyether is prepared from a bifunctional molecule selected from the group consisting of a sulfonated diacid, its sulfonated diester or the alkali metal salt thereof, said diacid being selected from the group consisting of isosulfophthalic and sulfosuccinic acid;

(b) with an amount of at least one diisocyanate sufficient to produce a prepolymer having only terminal isocyanate groups;

(c) and, a chain extending agent.

## 4,110,285
## PROCESS FOR THE PREPARATION OF STABLE AQUEOUS EMULSIONS OF ADDITION POLYMERS AND COPOLYMERS

**Dick A. Pons, Maassluis, and Anno Bijker, Spijkenisse, both of Netherlands, assignors to Synres International B.V., Hoek Van Holland, Netherlands**

**Filed Sep. 20, 1976, Ser. No. 725,118**
**Claims priority, application Netherlands, Sep. 25, 1975, 7511276**
**Int. Cl.[2] C08L *33/08***
**U.S. Cl. 260—29.6 MP** **11 Claims**

1. In a process for preparing an emulsion of an addition polymer in water by co-polymerizing at least one olefinically unsaturated monomer dispersed in water, in the presence of a suitable catalyst system, with at least one emulsion stabilizer, the improvement wherein a mixture, in an amount of between 0.1 and 15% by weight calculated to the total amount of polymerizable compounds, of phosphate esters of the formulae $(RO)_2PO(OH)$ and $(RO)PO(OH)_2$, is used as an emulsion stabilizer,

and wherein

R0 represents the residue remaining after the removal of the hydroxyl hydrogen from an unsaturated polymerizable alcohol of 2 to 12 carbon atoms, or an A-B-O group,

in which

A represents the residue remaining after the removal of the acid hydrogen from an unsaturated polymerizable carboxylic acid having 3 to 25 carbon atoms and,

B is an alkylene or cycloalkylene radical of from 2 to 20 carbon atoms, or a polyoxyalkylene radical having from 2 to 100 units

the bonding between A and B being a carbon-oxygen-carbon bonding.

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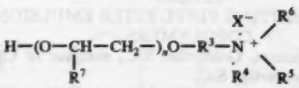
## 4,110,286
## STABLE POLYURETHANE LATICES, EMULSIFIABLE PREPOLYMERS THEREFOR AND METHODS OF MAKING THE SAME

**Jan E. Vandegaer, Pasadena, and John W. Calentine, Glen Burnie, both of Md., assignors to Alcolac Inc., Baltimore, Md.**

**Filed Feb. 7, 1977, Ser. No. 766,257**
**Int. Cl.[2] C08L *75/12;* C08G *18/32***
**U.S. Cl. 260—29.2 TN** **52 Claims**

1. In a process for preparing a polyurethane prepolymer wherein a reaction mixture consisting essentially of a mixture of (i) a stoichiometric excess of a polyisocyanate and (ii) a polyol are reacted under anhydrous conditions to form an isocyanate terminated prepolymer; the improvement which comprises incorporating into said reaction mixture, at any time while it is under anhydrous conditions, a small amount equivalent to from about 1% to about 5% by weight of the total weight of said polyisocyanate and said polyol of a quaternized tertiary amino alcohol of the formula:



wherein

$R^3$ represents an alkylene group of from 2 to about 10 carbon atoms;

$R^4$, $R^5$ and $R^6$, each of which may be the same or different, each represents alkyl, aryl, alkaryl or $R^5$ and $R^6$, taken together, represent a divalent aliphatic group of 4 to 5 atoms which jointly with the amino nitrogen form a five to six membered heterocyclic amino group;

$R^7$ represents H, methyl or ethyl;

X represents the anion of a quaternary ammonium group; and

*n* represents an integer, including 0, of from 0 to about 10;

heating the thus obtained mixture to a temperature of about 25° to about 110° C. to effect reaction between the hydroxyl group of said quaternized tertiary amino alcohol and some of the free isocyanate groups to form a carbamyl ester; whereby a self emulsifiable polyurethane prepolymer is obtained.

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4,110,287

## CATAPHORETIC N-HETEROCYCLIC-CONTAINING RESINS FOR ELECTRODEPOSITION

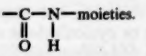
Joseph F. Bosso, Lower Burrell, and Nicholas T. Castellucci, Pittsburgh, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 561,012, Mar. 21, 1975, abandoned. This application Jun. 17, 1977, Ser. No. 807,757

Int. Cl.[2] C08L *63/02*

U.S. Cl. 260—29.2 EP 11 Claims

1. A water-dispersible resin which is electrodepositable on a cathode and which contains in the resin molecule cationic salt groups selected from the class consisting of amine salt groups, onium salt groups and mixtures thereof, said resin being prepared from polyglycidyl ethers of polyphenols which contain in the resin molecule N-heterocyclic moieties obtained by reacting said polyglycidyl ether of a polyphenol with an N-heterocyclic material containing a 5 or 6-membered ring and containing



—C(=O)—N(H)— moieties.

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4,110,288

## AQUEOUS VINYL POLYMERIC EMULSION SYSTEM AND PROCESS OF PREPARING THE SAME USING AMINOPLAST RESIN

Peter Jude Schirmann, Fairfield, and Werner Josef Blank, Wilton, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed Sep. 1, 1976, Ser. No. 719,879

Int. Cl.[2] C08L *61/22, 61/24, 61/28, 61/32*

U.S. Cl. 260—29.4 UA 14 Claims

1. A process for preparing an aqueous emulsion of a vinyl polymer comprising polymerizing at least one polymerizable vinyl monomer in an aqueous emulsion system in the presence of an emulsifying agent, a polymerization catalyst and from about 0.1% to about 5%, by weight, based on the weight of the monomer being polymerized, of a non-copolymerizable aminoplast resin which is water-soluble or water-dispersible in the presence of the emulsifying agent and which has been prepared from an amino compound, formaldehyde and a $C_1$–$C_4$ monohydric alcohol.

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4,110,289

## THERMOSETTING VINYL ESTER EMULSION COPOLYMERS

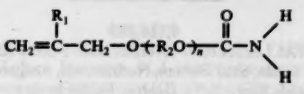
Martin K. Lindemann, Greenville, S.C., assignor to Chas. S. Tanner Co., Greenville, S.C.

Continuation of Ser. No. 340,535, Mar. 12, 1973, which is a continuation-in-part of Ser. No. 142,406, May 11, 1971. This application Jun. 30, 1976, Ser. No. 701,171

Int. Cl.[2] C08L *31/04*

U.S. Cl. 260—29.6 TA 7 Claims

1. An aqueous emulsion comprising an aqueous medium having colloidally suspended therein by means of a surfactant an aqueous emulsion copolymer consisting essentially of at least 85% of the copolymer of vinyl ester with a saturated aliphatic monocarboxylic acid containing up to 18 carbon atoms, and from 0.5–15% of the copolymer of monomers providing thermosetting characteristics and consisting essentially of an adduct of an allyl carbamate having one or both of its amino hydrogen atoms replaced by $C_1$–$C_8$ alcohol etherified methylol groups, said allyl carbamate having the formula:



$$CH_2{=}C(R_1){-}CH_2{-}O{-}(R_2O)_n{-}C(=O){-}N(H){-}H$$

in which $R_1$ is hydrogen or methyl, $R_2$ is an alkylidene group containing from 2–4 carbon atoms, and $n$ is an integer from 0–10.

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4,110,290

## PRESSURE-SENSITIVE ADHESIVES

Masatoshi Mori, and Ryoji Fukata, both of Tokyo, Japan, assignors to Toyo Ink Manufacturing Co., Ltd., Japan

Filed Feb. 28, 1977, Ser. No. 773,008

Claims priority, application Japan, Jun. 10, 1976, 51-67140

Int. Cl.[2] C09J *3/12*

U.S. Cl. 260—29.6 RW 4 Claims

1. An aqueous dispersion of a pressure-sensitive adhesive of improved binding power towards polyolefins comprising, by weight,

(A) 60 – 95 parts as solid matter of a 30–60% aqueous copolymer dispersion obtained by emulsion polymerization in water of a mixture of the following monomers (1), (2) and (3):

(1) 60–99 parts of at least one monomeric acylate having a $C_4$ – $C_{12}$ alkyl group,

(2) 1 – 7 parts of at least one monomer selected from the group consisting of $\alpha,\beta$-unsaturated carboxylic acids, acrylate and methacrylate containing a hydroxyl group, acrylamide, N-methylolacrylamide and N-butoxymethylacrylamide, each monomer being copolymerizable with the monomer (1), and

(3) 0 ∝ 39 parts of at least one monomer selected from the group consisting of vinylic copolymerizable monomers other than the monomers (1) and (2), and vinylidenic copolymerizable monomers and

(B) 5 – 40 parts as solid matter of a 40–60% aqueous dispersin of an ethylene-vinyl acetate copolymer.

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4,110,291

## COPOLYMER EMULSIONS FOR THICKENING ACRYLIC POLYMER LATICES

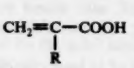
Eugene S. Barabas, Watchung; Andrew Klein, Somerville, and Dru W. Alwani, Wayne, all of N.J., assignors to GAF Corporation, New York, N.Y.

Filed Feb. 18, 1977, Ser. No. 773,503

Int. Cl.[2] C08L *33/06*

U.S. Cl. 260—29.6 RW 6 Claims

1. A method for thickening acrylic polymer latices which comprises blending therewith a copolymer latex prepared by inducing, at a temperature of about 5° C. to about 80° C, a redox-initiated polymerization in an aqueous dispersion of, as monomers, (1) from about 30 to about 75 wt. % of an $\alpha,\beta$-unsaturated carboxylic acid of the formula



$$CH_2{=}C(R){-}COOH$$

in which R is methyl or ethyl, and (2) from about 25 to about 70 wt. % of methylacrylate.

## 4,110,292
## PIGMENTED AIR DRYING LATEX PAINTS HAVING SUPERIOR GLOSS

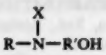
**Kazys Sekmakas, Chicago, and Kenneth K. Hesler, W. Chicago, both of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.**

**Continuation-in-part of Ser. No. 589,876, Jun. 24, 1975, Pat. No. 4,058,499. This application Jun. 6, 1977, Ser. No. 804,009**

**Int. Cl.[2] C08L *33/02***

**U.S. Cl. 260—29.6 RW** **9 Claims**

1. A method of producing a high gloss, air drying water base, pigmented latex paint comprising, grinding 3–12 parts of pigment into a water-free solution containing 1 part of an at least partially neutralized carboxyl-functional addition solution copolymerized copolymer of 10% to 40% of monoethylenically unsaturated carboxylic acid, the major proportion of said pigment being titanium dioxide and said solution containing 40% to 70% of alcoholic organic solvent based on the weight of the solution copolymer, said copolymer being at least partially neutralized with an hydroxy amine having the formula:



in which R is hydrogen or an alkyl group, R′ is an alkylene group, and X is either R or R′OH, to render the said copolymer dispersible in water, and thereby form a nonaqueous pigment paste, and then mixing the nonaqueous pigment paste with an air drying aqueous latex consisting essentially of emulsified aqueous emulsion copolymer particles having a $T_g$ below 20° C., the copolymer of said latex containing less than about 4% of reactive monomers.

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## 4,110,293
## PROCESS FOR STABILIZING LATEX AND STABLE LATICES PRODUCED THEREBY

**Paul H. Sandstrom, Tallmadge, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Apr. 22, 1977, Ser. No. 790,113**

**Int. Cl.[2] C08L *9/04***

**U.S. Cl. 260—29.7 R** **9 Claims**

1. In a process for synthesizing an emulsion polymer, the improvement which comprises incorporating from approximately 0.025 to 2.5 parts per 100 parts monomer of a salt selected from the group consisting of salts of alpha-methylstyrene/maleic anhydride adduct and salts of alpha-methylstyrene dimer/maleic anhydride adduct into the emulsifier solution.

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## 4,110,294
## PROCESSING AIDS FOR HIGH TEMPERATURE POLYMERS

**Timothy L. Pickering, Blauvelt, and James I. Hendrickson, New Windsor, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation of Ser. No. 458,495, Apr. 8, 1974, abandoned, which is a continuation of Ser. No. 303,193, Nov. 2, 1972, abandoned. This application Apr. 9, 1976, Ser. No. 675,425**

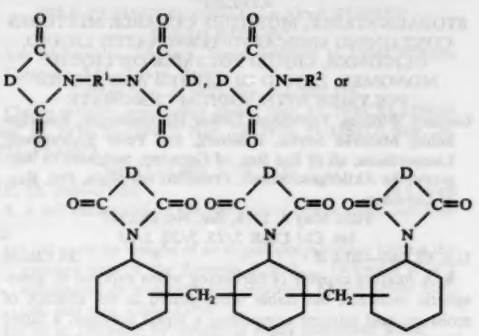
**Int. Cl.[2] C08K *5/34*; C08L *79/08***

**U.S. Cl. 260—30.2** **10 Claims**

1. A composition of matter comprising

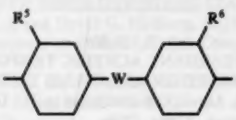
(a) a polyimide resin containing olefinic unsaturated end groups, and

(b) from about 10% to about 35% by weight based on the weight of (a) of an olefinic unsaturated imide compound of the formula

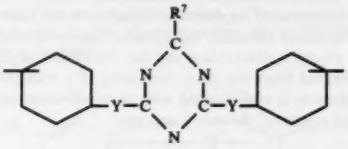


wherein

$R^1$ is an alkylene group containing from 2 to 12 carbon atoms; a cycloalkylene group containing from 4 to 6 carbon atoms, an arylene group selected from phenylene, xylylene, tolylene, biphenylene, naphthylene, a substituted arylene group of the formula



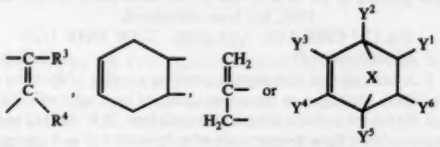
wherein W is sulfur, carbonyl, —SS—, O, sulfonyl, $R^5$ and $R^6$ are independent and each is hydrogen, chloro, bromo, a (lower)alkyl group containing from 1 to 5 carbon atoms, or a (lower) alkoxy group containing from 1 to 5 carbon atoms; or a group having the formula



where Y is a covalent bond or —NH—, and $R^7$ is phenyl, piperidino, H, diphenylamino or di(lower)alkyl amino;

$R^2$ is an alkyl group of from 1 to 8 carbon atoms, an alkenyl group of from 3 to 18 carbon atoms, an aryl group, an alkaryl group, nitrophenyl and aminophenyl;

D is a divalent radical containing olefinic unsaturation having the formula



wherein

$R^3$ is hydrogen, methyl, bromo or chloro;

$R^4$ is hydrogen, bromo or chloro;

$Y^1$–$Y^6$ inclusive is selected from the group consisting of hydrogen, bromine, chlorine, nitro, phenyl, alkyl of from 1 to 6 carbon atoms;

X is carbonyl, oxygen, sulfur, chloro or bromo substituted methylene, alkylidene of from 1 to 6 carbon atoms, and benzylidene.

## 4,110,295
## STORAGE-STABLE, MOISTURE CURABLE MIXTURES CONTAINING MERCAPTO-TERMINATED LIQUID, OLIGOMER, LIQUID POLYMER OR LIQUID MONOMER, LIQUID OLIGOMER AND LIQUID POLYMER WITH SODIUM CHROMATE

**Gerhard Wilhelm, Viernheim; Lothar Hockenberger, Ludwigshafen; Manfred Soyka, Duisburg, and Peter Endruscheit, Lampertheim, all of Fed Rep. of Germany, assignors to Rütgerswerke Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed May 4, 1976, Ser. No. 683,137**
**Int. Cl.[2] C08K** *5/15, 5/20, 5/05*
**U.S. Cl. 260—30.4 R** **26 Claims**

8. A mixture capable of hardening when exposed to atmospheric moisture, but stable when stored in the absence of moisture, said mixture comprising a liquid polymer, a liquid oligomer or a mixture of a liquid monomer, oligomer and polymer having at least one terminal mercapto group and a latent hardener comprised of a paste containing anhydrous sodium chromate and a water-soluble organic solvent.

14. Mixture according to claim 8 wherein said solvent is selected from the group consisting of dimethyl formamide, dimethyl sulfoxide, methanol, ethanol, glycol, glycerin and dioxane.

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## 4,110,296
## FIRE RETARDANT ACRYLIC TERPOLYMER COMPOSITION AND FILMS THEREOF

**Jin Liang Wang, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Dec. 17, 1976, Ser. No. 751,935**
**Int. Cl.[2] C08K** *3/16, 3/32, 5/49;* **C08F** *120/00*
**U.S. Cl. 260—30.6 R** **4 Claims**

1. A flame retardant polymer film comprising a terpolymer and a fire retardant plasticizer, said terpolymer being a reaction product of (1) 20–60 weight percent 2-ethylhexyl acrylate, (2) 10 to 40 weight percent acrylonitrile, and (3) 20 to 70 weight percent halogenated monomer selected from the class consisting of vinylidene chloride, halogenated phenyl acrylate, halogenated phenyl methacrylate and the fire retardant plasticizer being selected from the class consisting of a triorgano phosphate, alone or in combination with decabromodiphenyl oxide and metal oxides of antimony and zinc.

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## 4,110,297
## WIRE ENAMEL WITH LOW SOLDERING TEMPERATURE

**Thomas A. Shelby, and Shelby W. Gallien, both of Fort Wayne, Ind., assignors to Rea Magnet Wire Co., Inc., Fort Wayne, Ind.**

**Continuation-in-part of Ser. No. 531,458, Dec. 11, 1974, Pat. No. 3,988,251. This application Sep. 13, 1976, Ser. No. 722,823**
**The portion of the term of this patent subsequent to Oct. 26, 1993, has been disclaimed.**
**Int. Cl.[2] C08K** *5/01, 5/13;* **C08L** *75/04;* **H01B** *3/20*
**U.S. Cl. 260—33.4 P** **10 Claims**

1. A wire enamel coating composition capable of forming an insulative coating on a wire characterized by a solderability of less than 1 second at a temperature of about 285°–315° C and a thermoplastic flow temperature of at least 230° C and comprising:

(a) 25–27 parts by weight of a polyurethane ester resin containing 4–10% by weight free hydroxyl content;

(b) 23–25 parts by weight of a blocked isocyanate;

(c) about 48–52 parts by weight of a solvent capable of dissolving said resin and said blocked isocyanate and containing at least 45% by weight of cresylic acid, with the balance of the solvent having a boiling point of less than 200° C; and

(d) 0.1 to 10.0% by weight of solids of a catalyst.

## 4,110,298
## TRIOXANE PRODUCTION

**William J. Wells, III, Houston, and Adin Lee Stautzenberger, Corpus Christi, both of Tex., assignors to Celanese Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 718,638, Aug. 30, 1976, abandoned. This application May 31, 1977, Ser. No. 801,690**
**Int. Cl.[2] C07D** *323/06*
**U.S. Cl. 260—340** **6 Claims**

1. In a process for manufacturing trioxane which comprises distilling an aqueous formaldehyde solution intimately mixed with a substantially immiscible oily liquid phase in the presence of an acid catalyst, the improvement which comprises using as said oily liquid phase a monobutyl ether of polyoxypropylene glycol having an average molecular weight of from about 2050 to about 2500.

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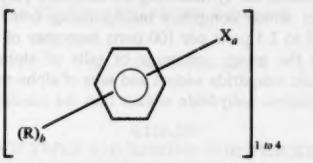
## 4,110,299
## FLAME-RETARDANT POLYCARBONATE COMPOSITION

**Victor Mark, Evansville, Ind., assignor to General Electric Company, Pittsfield, Mass.**

**Filed Oct. 15, 1976, Ser. No. 733,016**
**Int. Cl.[2] C08K** *5/45, 5/34, 5/15*
**U.S. Cl. 260—37 PC** **14 Claims**

1. An improved flame-retardant polycarbonate composition of an aromatic carbonate polymer in admixture with 0.01 to about 5.0 parts per hundred parts of the aromatic carbonate polymer of an additive selected from the group consisting of organic alkali metal salts of aromatic sulfonic acids, organic alkaline earth metal salts of aromatic sulfonic acids or mixtures thereof, the improvement which comprises having in admixture with the flame retardant aromatic carbonate polymer an additive which is an inorganic halide selected from alkali metal and alkaline earth metal halides wherein the halide substituent is bromine, chlorine or iodine, and an organic monomeric, polymeric aromatic and heterocyclic halide or mixtures thereof; said inorganic halide being present in amounts of from 0.01 to about 5.0 parts per hundred parts of the aromatic carbonate polymer; said monomer aromatic halide is present in amounts of from 0.10 to about 10.0 parts per hundred parts of aromatic carbonate polymer and is selected from the following formulae:

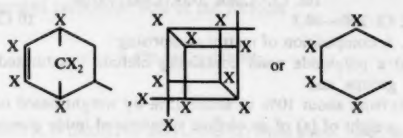
a.




wherein R is either hydrogen, alkyl, aryl, alkoxy, aryloxy, alkylthio, arylthio, alkysulfonyl, arylsufonyl of 1 to 20 carbon atoms or an electron withdrawing radical; X is independently chlorine or bromine; *a* is integer of 1 1 to 6 and *b* is 6 and *b* is 6-*a* and wherein R can be substituted by electron withdrawing substituents;

b. $R'_cR''_d$

wherein R′ may be either:



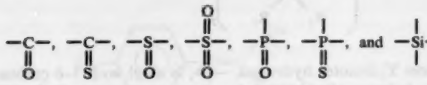
wherein X is independently chlorine or bromine; R'' is an aryl radical of 1–4 aromatic rings; *c* is an integer of 1–2; and *d* is an integer of 1–2; said polymeric aromatic halide is present in amounts of from 0.10 to about 10.0 parts per hundred parts of aromatic carbonate polymer and has the following formula:

$$([R_1]_e\{[Y]_f[A]_{1-3}\})_g([R_1]_e\{[Y]_f[A]_{1-3}\})_h$$

wherein [A] is selected from the following formula:

$$(O)_i R_2(X)_j$$

wherein (O) is oxygen; *i* is an integer of 0 to 4; $R_2$ is an aromatic radical of one to four aromatic rings; X is chlorine or bromine; *j* is an integer of 0 to 10; $R_1$ is an organic radical of 1–20 carbon atoms and is either alkyl, aralkyl, alkenyl, aralkenyl, aryl, arylene, alkylene, aralkylene, alkenylene, aralkenylene, alkylidene, aralkylidene, alkenylidene or aralkenylidene, and the group [A] , as well as a trivalent and tetravalent aromatic nucleus and $R_1$ can contain an electron withdrawing radical; [Y] is a di-, tri- or tetravalent radical selected from the following:



*e* is an integer of 0–3; *f* is an integer of 0–2; *g* is an integer of 0–2000 and *h* is an integer of from 0–2000; provided, however, that the sum of *g* and *h* must be at least 4 and can be as high as 2000; and, said heterocyclic halide is present in amounts of from 0.10 to about 10.0 parts per hundred parts of aromatic carbonate polymer and has the following formula:

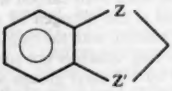
$$X_{0\text{-}15}R_4$$

wherein X is independently chlorine or bromine and R is an organic nucleus selected from the group of organic heterocyclic nuclei consisting of

A.

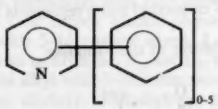
wherein Z is selected from the hetero atoms considering of sulfur, oxygen and nitrogen,

B.



wherein Z and Z' are independently selected from the group consisting of carbon and the hetero atoms, nitrogen, sulfur and oxygen, providing that at least one Z is a hetero atom,

C.



**11**. The composition of claim **1** which contains a flame-retardant additive selected from the group consisting of a siloxane, a fluorinated polyolefin and fibrous glass in an amount sufficient to render the aromatic carbonate polymer composition non-dripping in the proximity of a flame.

**4,110,300**

## SELF-EXTINGUISHING SILICONE RUBBER COMPOSITIONS

**Takao Matsushita, Ichihara, Japan, assignor to Toray Silicone Company, Ltd., Tokyo, Japan**

**Filed Nov. 4, 1977, Ser. No. 849,114**

**Claims priority, application Japan, Nov. 12, 1976, 51-135410; Nov. 12, 1976, 51-135411; Nov. 12, 1976, 51-135412; Mar. 25, 1977, 52-32073**

**Int. Cl.**[2] **C08K** *3/36, 3/26, 3/22*

**U.S. Cl. 260—37 SB** **16 Claims**

**1**. A self-extinguishing silicone rubber composition comprising:

(a) 100 parts by weight of an organopolysiloxane having the average unit of the formula $R_aSiO_{4-a/2}$ (wherein R is a substituted or unsubstituted univalent hydrocarbon radical, and $a = 1.98 \sim 2.05$);

(b) 10 to 150 parts by weight of finely powdered silica;

(c) $10^{-4}$ to $10^{-2}$ part by weight of platinum or an amount of a platinum compound containing the same amount of platinum, and

(d) 0.5 to 30 parts by weight of finely powdered γ-type iron sesquioxide.

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**4,110,301**

## POLYESTER FIBER DYE STABILIZATION

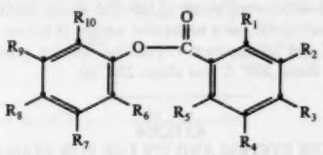
**Joseph S. Zannucci, and David G. Hedberg, Jr., both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jul. 29, 1976, Ser. No. 709,680**

**Int. Cl.**[2] **C08K** *5/10*

**U.S. Cl. 260—40 P** **4 Claims**

**1**. The composition comprising poly(1,4-cyclohexylenedimethylene terephthalate) containing one or more of from about 3–12 weight percent based on total polymer weight of poly(oxyethylene glycol) having a molecular weight of from about 300 to about 800, from about 5 to about 15 mole percent of isophthalic acid and from about 0.5 to about 5.0 mole percent of 5-sodiosulfoisophthalic acid based on total acid moles, blended with from about 0.01 to about 5.0% by weight based on total polymer weight of one or more rearrangeable compounds of the formula



where $R_1$–$R_{10}$ may be the same or different and selected from straight or branched alkyl or alkoxy of 1–6 carbons, hydrogen, and hydroxyl, and in all cases either $R_6$ or $R_{10}$ must be hydrogen.

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**4,110,302**

## REINFORCED POLYCARBODIIMIDE MODIFIED POLYALKYLENE TEREPHTHALATE

**Norman W. Thomas, Warren; Frank M. Berardinelli, Millington, both of N.J., and Robert Edelman, Staten Island, N.Y., assignors to Celanese Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 616,348, Sep. 24, 1975, abandoned. This application Mar. 7, 1977, Ser. No. 775,124**

**Int. Cl.**[2] **C08G** *63/46, 63/76*

**U.S. Cl. 260—40 R** **19 Claims**

**1**. In a process for producing a reinforced polyalkylene terephthalate molding resin composition comprising intimately mixing in the molten state a reinforcing agent with a polyalkylene terephthalate polymer which is the reaction product of terephthalic acid or a dialkyl ester of terephthalic acid and a glycol selected from the group consisting of trimethylene

glycol, tetramethylene glycol, and mixtures thereof, said polyalkylene terephthalate having an intrinsic viscosity of from about 0.2 to about 1.2 deciliters per gram, the improvement comprising

modifying said polyalkylene terephthalate polymer by reacting the polyalkylene terephthalate polymer in the molten state with at least one polycarbodiimide, which polycarbodiimide both

(1) is derived from at least one aromatic diisocyanate which is either unsubstituted or contains up to one methyl substituent on each aromatic ring, and

(2) contains at least two carbodiimide units per polycarbodiimide molecule,

whereby said resulting molding resin composition exhibits a substantially improved impact strength.

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## 4,110,303
## MULTICOMPONENT POLYOLEFIN-BLOCK COPOLYMER-POLYAMIDE BLENDS

**William P. Gergen, and Sol Davison, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.**

**Division of Ser. No. 766,174, Feb. 7, 1977, Pat. No. 4,081,424, which is a continuation-in-part of Ser. No. 693,463, Jun. 7, 1976, abandoned. This application Dec. 22, 1977, Ser. No. 863,382**

**Int. Cl.[2] C08K 7/14**

**U.S. Cl. 260—42.18** **31 Claims**

1. A composition comprising the admixture obtained by intimately mixing about 4 to about 40 parts by weight of a block copolymer, about 5 to about 48 parts by weight of a polyamide, and a polyolefin in a weight ratio of polyolefin to polyamide of at least 1:1, so as to form a polyblend wherein at least two of the polymers have at least partial continuous interlocked networks with each other and wherein:

(a) said block copolymer comprises at least two monoalkenyl arene/polymer end blocks A and at least one substantially completely hydrogenated conjugated diene polymer mid block B, said block copolymer having an 8 to 55 percent by weight monoalkenyl arene polymer block content, each polymer block A having an average molecular weight of between about 5,000 and about 125,000, and each polymer block B having an average molecular weight of between about 10,000 and about 300,000; and

(b) said polyolefin has a molecular weight in excess of about 10,000 and an apparent crystalline melting point of between about 100° C and about 250° C.

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## 4,110,304
## STABILIZER SYSTEM AND ITS USE FOR STABILIZING STYRENE POLYMERS

**Bernard Gilg, Saint-Louis, France; Helmut Muller, Binningen, and Jean Rody, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

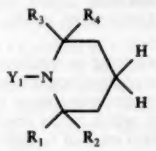
**Continuation-in-part of Ser. No. 461,188, Apr. 12, 1974, abandoned. This application Dec. 5, 1975, Ser. No. 638,226**

**Claims priority, application Switzerland, Apr. 19, 1973, 5753/73**

**Int. Cl.[2] C08K 5/34**

**U.S. Cl. 260—45.8 N** **7 Claims**

1. A stabilizer system consisting essentially of a) at least one sterically hindered cyclic amine selected from the group consisting of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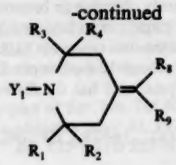
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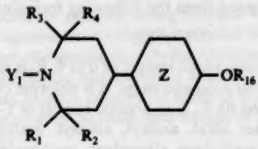
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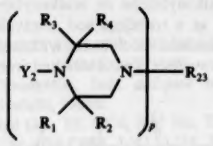
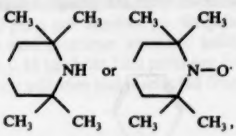
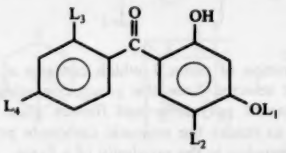

(4)

wherein $Y_1$ denotes hydrogen, —O·, is alkyl with 1–8 carbon atoms, halogenoalkyl with 1–5 carbon atoms, cyanoalkyl with 1–5 carbon atoms, epoxylalkyl with 3–4 carbon atoms, hydroxyaralkyl with 8–12 carbon atoms, acyloxyalkyl with 4–20 carbon atoms, aminoalkyl with 2–4 carbon atoms, acylamine with 2–18 carbon atoms, alkoxycarbonyalkyl with 3–21 carbon atoms, alkoxyalkyl with 3–20 carbon atoms, aralkyl with 7–20 carbon atoms, alkenyl with 3–6 carbon atoms or alkinyl with 3–6 carbon atoms, $R_1$ and $R_2$ represent methyl or together represent $—(CH_2)_5—$, $R_3$ represents methyl, $R_4$ represents alkyl with 1–5 carbon atoms or together with $R_3$ represents the radicals $—(CH_2)_4—$, $—(CH_2)_3$,



$R_8$ and $R_9$ independently of one another denote alkoxycarbonyl with 2–6 carbon atoms, benzoyl, nitrile or phenyl, $R_{16}$ denotes hydrogen or the radical of an acyl group which is derived from an aliphatic carboxylic acid with 2–18 carbon atoms, from an aromatic carboxylic acid with 7–10 carbon atoms or from a carbamic acid substituted at the nitrogen by alkyl with 1–12 carbon atoms, benzyl or phenyl, with the ring Z representing a benzene or cyclohexane ring which is not substituted further or is substituted further by 1–2 alkyl groups with 1–5 carbon atoms, $R_{23}$ denotes hydrogen, alkyl with 1–20 carbon atoms, benzyl, alkylene with 1–20 carbon atoms, or alkoxycarbonyalkyl with 2–26 carbon atoms, or an acyl group which is derived from an aliphatic carboxylic acid with 2–20 carbon atoms, from benzoic acid or from a carbamic acid substituted at the nitrogen by alkyl with 1–24 carbon atoms or phenyl, $Y_2$ denotes hydrogen, —O· or methyl and *p* represents an integer of 1 to 3 and

b) at least one co-stabilizer of the formulae


(II)

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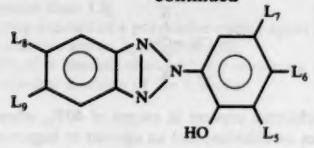
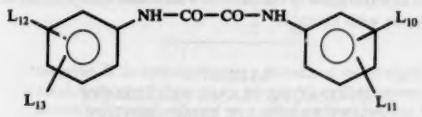


(III)



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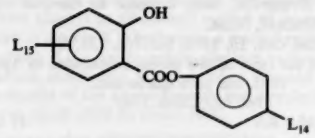

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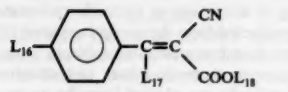

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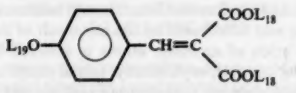

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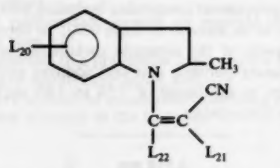

(VIII)

in which $L_1$ denotes hydrogen alkyl with 1–18 carbon atoms, allyl, methallyl or benzyl, $L_2$ denotes hydrogen, $L_3$ denotes hydrogen or hydroxyl, $L_4$ denotes hydrogen, hydroxyl alkoxy with 1–20 carbon atoms, allyloxy, methallyloxy or benzyloxy, $L_5$ denotes hydrogen, alkyl with 1–12 carbon atoms, alkenyl with 3–12 carbon atoms, cyclohexyl, aralkyl with 7–11 carbon atoms, phenyl, acylamino with 2–12 carbon atoms, acylaminomethyl with 3–13 carbon atoms, chlorine or bromine, $L_6$ denotes hydrogen, methyl, hydroxyl, alkoxy with 1–12 carbon atoms or acylamino with 2–12 carbon atoms, $L_7$ denotes hydrogen, alkyl with 1–12 carbon atoms, aralkyl with 7–11 carbon atoms, cyclohexyl, phenyl, alkoxycarbonylethyl with 4–15 carbon atoms, alkoxy with 1–12 carbon atoms, chlorine, bromine, carboxyl, alkoxycarbonyl with 2–13 carbon atoms or acylamino with 2–12 carbon atoms, $L_8$ denotes hydrogen, alkyl with 1–8 carbon atoms, alkoxy with 1–12 carbon atoms, chlorine, bromine, acylamino with 2–12 carbon atoms, carboxyl, alkoxycarbonyl with 2–13 carbon atoms, acyloxy with 2–12 carbon atoms, carbamoyl with 3–17 carbon atoms, alkoxysulphonyl with 1–12 carbon atoms, phenoxysulphonyl or sulphonamido with 2–16 carbon atoms, $L_9$ denotes hydrogen, methyl, chlorine or bromine, $L_{10}$ and $L_{12}$ independently of one another denote alkyl with 1–8 carbon atoms, alkoxy with 1–12 carbon atoms, allyloxy, methallyloxy, phenoxy, benzyloxy, chlorine, bromine or alkoxycarbonyl with 2–13 carbon atoms, $L_{11}$ and $L_{13}$ independently of one another denote hydrogen or alkyl with 1–8 carbon atoms, $L_{14}$ and $L_{15}$ independently of one another denote hydrogen or alkyl with 1–12 carbon atoms, $L_{16}$ denotes alkoxy with 1–12 carbon atoms, $L_{17}$ denotes alkyl with 1–3 carbon atoms or phenyl, $L_{18}$ denotes alkyl with 1–12 carbon atoms, $L_{19}$ denotes alkyl with 1–12 carbon atoms, $L_{20}$ denotes hydrogen, alkyl with 1–8 carbon atoms, alkoxy with 1–8 carbon atoms or chlorine, $L_{21}$ denotes nitrile or alkoxycarbonyl with 2–20 carbon atoms and $L_{22}$ denotes hydrogen or alkyl with 1–3 carbon atoms, the ratio of stabilizer (a) to co-stabilizer (b) being from 1:10 to 10:1.

6. Polystyrene or styrene copolymers containing a stabilizer system according to claim 1.

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**4,110,305**

## POLYMERS STABILIZED BY ESTERS OF PIPERIDINOLS

**Brian Holt, Oldham, and Donald Richard Randell, Stockport, both of England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

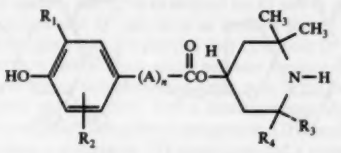
**Division of Ser. No. 475,718, Jun. 3, 1974, Pat. No. 3,992,390, which is a continuation-in-part of Ser. No. 309,853, Nov. 27, 1972, abandoned. This application Nov. 15, 1976, Ser. No. 741,813**

**Claims priority, application United Kingdom, Nov. 30, 1971, 55486/71**

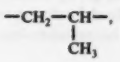
**Int. Cl.[2] C08K *5/34***

**U.S. Cl. 260—45.8 N** **7 Claims**

1. A composition of matter stabilized against ultraviolet deterioration which comprises a synthetic organic polymer normally subject to ultraviolet deterioration containing from 0.1% to 2% by weight of the polymer of a stabilizing compound of the formula

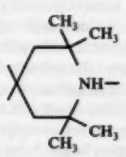


wherein A is $-CH_2-$, $-CH_2CH_2-$ or



$R_1$ and $R_2$ are the same or different and each is a straight- or branched-chain alkyl group having from 1 to 6 carbon atoms, or 1-methylcyclohexyl or $\alpha,\alpha$-dimethylbenzyl,

$R_3$ and $R_4$ ar the same or different and each is an alkyl group having from 1 to 12 carbon atoms or $R_3$ and $R_4$ together with the carbon atom to which they are bound form a saturated alicyclic residue having from 5 to 8 carbon atoms or the group of formula:



and $n$ is 0 or 1.

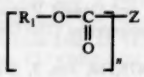
**4,110,306**

## STABILIZERS FOR SYNTHETIC POLYMERS COMPRISING 2,2,6,6-TETRAMETHYL-4-PIPERIDYL CARBOXYLIC ACID ESTER, A TRIPHOSPHITE, AND AN ACID PHOSPHITE OR SALT THEREOF

**Motonobu Minagawa, Kosigaya; Naohiro Kubota, and Toshihiro Shibata, both of Urawa, all of Japan, assignors to Argus Chemical Corporation, Brooklyn, N.Y.**

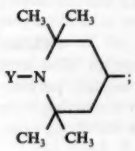
**Filed Nov. 22, 1976, Ser. No. 744,053**
**Claims priority, application Japan, Dec. 1, 1975, 50-144,357**
**Int. Cl.[2] C08K *5/34***
**U.S. Cl. 260—45.8 N** **30 Claims**

1. A stabilizer composition for organic polymeric materials comprising an amount with the range from about 69.5 to about 10% of a triphosphite, an amount within the range from about 10 to about 0.5% of an acid phosphite, the acid phosphite being selected from the group consisting of acid phosphites, acid phosphite metal salts and acid phosphite ammonium salts, and an amount within the range from about 89.5 to about 30% of a 2,2,6,6-tetramethyl-4-piperidyl carboxylic acid ester having the general formula:



wherein:

$R_1$ is selected from the group consisting of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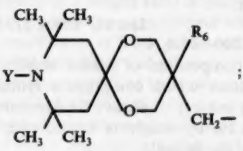
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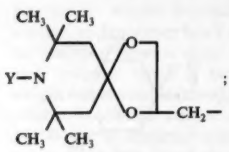
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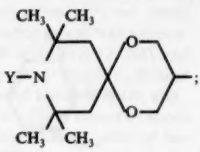
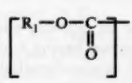

;

Y is selected from the group consisting of hydrogen and O;

$R_6$ is lower alkyl having from one to six carbon atoms;

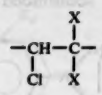
*n* is selected from the group consisting of 1, 2, 3 and 4; and

Z is an organic radical having a valence from 1 to 4, the valence positions being taken by



groups, and from one to about twenty carbon atoms, and selected from the group consisting of alkyl, alkenyl, alkylene, alkenylene, alkylidene; aryl, arylene, aralkyl, aralkylene, aralkylidene, alkaryl, alkarylene, alkarylidene; heterocycloalkyl, heterocycloalkylene, heterocycloalkylidene; cycloalkyl, cycloalkenyl, cycloalkylene, cycloalkenylene, cycloalkylidene, alkcycloalkyl, alkcycloalkenyl, alkcycloalkenylene, alkcycloalkylene, cycloalkalkylene, cycloalkalkyl, cycloalkalkenyl, and cycloalkalkenylene, and amino- and hydroxy-substituted such radicals.

21. A polyvinyl chloride resin composition having improved resistance to deterioration when heated at 350° F, comprising a polyvinyl chloride resin formed at least in part of the recurring group



and having a chlorine content in excess of 40%, where X is either hydrogen or chlorine; and an amount to improve resistance to deterioration of the resin of a stabilizer composition in accordance with claim 1.

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**4,110,307**

## NON-OPAQUE FLAME RETARDANT POLYCARBONATE COMPOSITION

**Victor Mark, Evansville, Ind., assignor to General Electric Company, Pittsfield, Mass.**

**Filed Oct. 15, 1976, Ser. No. 733,014**
**The portion of the term of this patent subsequent to Apr. 27, 1993, has been disclaimed.**
**Int. Cl.[2] C08K *5/42***
**U.S. Cl. 260—45.9 KA** **17 Claims**

1. In a flame retardant aromatic carbonate polymer composition comprising in admixture an aromatic carbonate polymer and an additive selected from the group consisting of the metal salts of substituted and unsubstituted sulfonic acids of monomeric and polymeric aromatic ethers and mixtures thereof, wherein said metal salts are selected from the group consisting of alkali metals and alkaline earth metals, and mixtures of these metal salts, and said substituent on the metal salt of the substituted sulfonic acids of aromatic ethers is selected from the group consisting of alkyl, aryl, alkoxy, and aryloxy of 1 to 12 carbon atoms and electron withdrawing radicals and mixtures thereof; the improvement comprising including said additive in said admixture in an amount of from 0.001 to about 2.0 parts per hundred parts of the aromatic carbonate polymer, said aromatic carbonate polymer and said additive each having a refractive index in the range of 1.54 to 1.65 such that said composition is non-opaque.

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**4,110,308**

## STABILIZED ETHYLENE-TETRAFLUOROETHYLENE COPOLYMER COMPOSITION

**Takeshi Abe; Masahiko Ichimura; Makoto Noshiro; Nobuaki Kunii, and Yasumichi Ito, all of Yokohama, Japan, assignors to Ashai Glass Company Ltd., Tokyo, Japan**

**Filed Aug. 25, 1976, Ser. No. 717,688**
**Claims priority, application Japan, Aug. 25, 1975, 50-102096**
**Int. Cl.[2] C08K *3/22, 3/06***
**U.S. Cl. 260—45.75 C** **10 Claims**

1. An ethylene-tetrafluoroethylene copolymer composition having improved thermal stability which comprises an ethylene-tetrafluoroethylene copolymer wherein said copolymer comprises from 30 to 60 mole % of tetrafluoroethylene units, and from 0.1 ppm to 10 wt.% of a copper compound based on the weight of the copolymer and wherein said copper compound is copper, copper oxide, or a compound which is converted to copper oxide by heating in air at the molding temperature of said copolymer.

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**4,110,309**

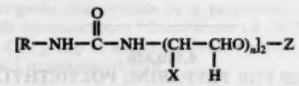
## POLYETHER DIUREIDE EPOXY ADDITIVES

**Heinz Schulze, and Harold G. Waddill, both of Austin, Tex., assignors to Texaco Development Corporation, New York, N.Y.**

**Filed Nov. 22, 1976, Ser. No. 743,814**
**Int. Cl.[2] C08G *59/56***
**U.S. Cl. 528—119** **22 Claims**

1. An epoxy resin composition having superior adhesion properties and being the cured product of a curable admixture which comprises:

a vicinal polyepoxide having an epoxide equivalency of greater than 1.8;
a curing amount of a polyamine curing agent having at least 3 reactive amino hydrogens; and,
an effective amount of an additive consisting essentially of a polyether diureide of the formula:



wherein R is hydrogen; or, a branched or straight chain alkyl radical of from 1 to about 10 carbon atoms, or a monocyclic aryl, alkaryl or aralkyl radical having from 6 to about 12 carbon atoms; or, are branched or straight chain alkenyl or alkadienyl radical of from 2 to about 10 carbon atoms; X is hydrogen, a methyl radical or an ethyl radical; Z is a hydrocarbon alkylene radical having 2 to 5 carbon atoms and *n* is a number selected such that the molecule of the above formula has a molecular weight of from about 2000 to about 3000.

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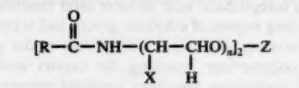
## 4,110,310
## POLYETHER DIAMIDE EPOXY ADDITIVES

**Heinz Schulze, and Harold G. Waddill, both of Austin, Tex., assignors to Texaco Development Corporation, New York, N.Y.**

**Filed Nov. 22, 1976, Ser. No. 743,817**
**Int. Cl.² C08G *59/50***
**U.S. Cl. 528—119** **28 Claims**

1. An epoxy resin composition having superior adhesion properties and being the cured product of a curable admixture which comprises:
a vicinal polyepoxide having an epoxide equivalency of greater than 1.8;
a curing amount of a polyamine curing agent having at least 3 reactive amino hydrogens; and,
an effective amount of an additive consisting essentially of a polyether diamide of the formula:



wherein R is hydrogen; or, a branched or straight chain alkyl radical of from 1 to about 10 carbon atoms, or a monocyclic aryl, alkaryl or aralkyl radical having from 6 to about 12 carbon atoms; or, is a branched or straight chain alkenyl or alkadienyl radical of from 2 to about 10 carbon atoms; X is hydrogen, a methyl radical or an ethyl radical; Z is a hydrocarbon alkylene radical having 2 to 5 carbon atoms and *n* is a number selected such that the molecule of the above formula has a molecular weight of from about 2000 to about 3000.

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## 4,110,311
## MOLECULAR WEIGHT CONTROL OF POLYPHENYLENE ETHERS

**Glenn Dale Cooper, Delmar, and Daniel Edwin Floryan, Glenmont, both of N.Y., assignors to General Electric Company, Pittsfield, Mass.**

**Filed Dec. 13, 1976, Ser. No. 749,762**
**Int. Cl.² C08G *65/44***
**U.S. Cl. 528—215** **22 Claims**

1. In a process for forming a polyphenylene ether by an oxidative coupling reaction in the presence of a chelatable metal ion-amine complex catalyst comprising passing an oxygen containing gas through a reaction solution of a phenol and said catalyst, the improvement which comprises terminating the reaction and stabilizing the polymer against degradation by contacting the reaction solution with (i) a chelating agent for such ion in combination with (ii) a dihydric phenol and a reducing agent, and recovering the polyphenylene ether from the reaction solution.

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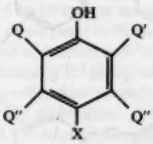
## 4,110,312
## METHOD FOR PREPARING POLYPHENYLENE OXIDES WITH MANGANESE-VINYL RESIN COMPLEXES

**Eugene George Banucci, Scotia, and Walter Karl Olander, Clifton Park, both of N.Y., assignors to General Electric Company, Pittsfield, Mass.**

**Filed Dec. 21, 1976, Ser. No. 753,562**
**Int. Cl.² C08G *61/00, 61/10, 65/00***
**U.S. Cl. 528—215** **19 Claims**

1. A method for the preparation of polyphenylene oxide resin which comprises oxidatively coupling a phenolic monomer of the formula:



wherein X is a substituent selected from the group consisting of hydrogen, chlorine, bromine and iodine, Q is a monovalent substituent selected from the group consisting of hydrocarbon radicals, halohydrocarbon radicals having at least two carbon atoms between the halogen atom and the phenol nucleus; hydrocarbonoxy radicals, halohydrocarbonoxy radicals having at least two carbon atoms between the halogen atom and the phenol nucleus and Q′ is as defined for Q and in addition may be halogen and Q″ are each as defined for Q′ and in addition hydrogen, with the proviso that Q, Q′ and Q″ are all free of a tertiary carbon atom; under polymer forming reaction conditions to form a polyphenylene oxide resin in the presence of an organic solvent, base, and a heterogeneous polymer-bound catalyst which comprises a manganese (II) complex that is formed from a manganese (II) compound and a crosslinked vinyl resin having units that contain a benzoin oxime group.

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## 4,110,313
## EPOXY CURING AGENT

**Heinz Schulze, and Harold G. Waddill, both of Austin, Tex., assignors to Texaco Development Corporation, New York, N.Y.**

**Filed Jul. 5, 1977, Ser. No. 812,558**
**Int. Cl.² C08G *59/50, 59/56***
**U.S. Cl. 528—90** **6 Claims**

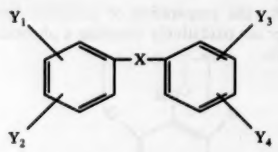
1. A method for acclerating the curing of an epoxy resin with at least a stoichiometric amount of a polyoxyalkylenepolyamine curing component wherein the curing component comprises a polyoxyalkylene-polyamine having a molecular weight of from about 230 to about 2000 and a dithiocarbamate salt of the polyoxyalkylene polyamine, wherein about 50 wt% to about 100 wt% of said polyoxyalkylenepolyamine is replaced by the dithiocarbamate salt of said polyoxyalkylenepolyamine.

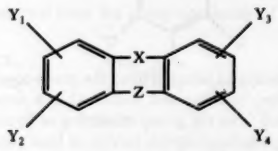
## 4,110,314
## PROCESS FOR PREPARING AN AROMATIC POLYMER IN THE PRESENCE OF AN INERT NONPOLAR AROMATIC REACTION LUBRICANT

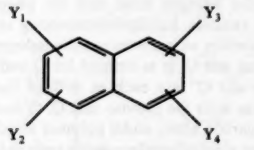
Norio Yagi; Hideki Matsumura; Tatsuhiro Aoyagi, and Ikuji Kishi, all of Machida, Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 16, 1976, Ser. No. 751,479
Claims priority, application Japan, Dec. 19, 1975, 50-151301
Int. Cl.[2] C08G *65/40, 75/23*
U.S. Cl. 528—26 6 Claims

1. A process for preparing an aromatic polymer which comprises polymerizing a dialkali metal salt of a diphenol with a dihalodiphenyl compound, having an electron withdrawing group in at least one of the positions ortho or para to each of the halogen atoms, at 200° C to 400° C, in an inert gas atmosphere, in the presence of from 0.1 to 30% by weight of an inert nonpolar aromatic reaction lubricant selected from the group consisting of anthracene, phenanthrene and a compound of the formula


(1)


(2)


(3)

wherein

X represents a single bond or methylene, ethylene, propylene or propylidene group or oxygen or sulfur atom;

$Y_1$, $Y_2$, $Y_3$ and $Y_4$ respectively represent hydrogen atom or methyl, ethyl, methoxy, ethoxy, aryl or benzyl group and

Z represents methylene group or oxygen or sulfur atom;

wherein said dialkali metal salt of a diphenol and said dihalodiphenyl compound are polycondensed in the molar ratio of from 1:0.95 to 1:1.10.

## 4,110,315
## MOLDED CONTAINER OF POLYESTER PREPARED FROM A BIS(HYDROXYETHOXYPHENYL)SULFONE

Santos W. Go, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Continuation-in-part of Ser. No. 690,483, May 27, 1976, abandoned. This application Jul. 5, 1977, Ser. No. 812,921
Int. Cl.[2] C08G *63/66, 63/68*
U.S. Cl. 528—294 8 Claims

1. A molded container formed from materials which comprise a linear copolyester consisting essentially of the polymeric reaction product of

(A) isophthalic acid and, optionally, terephthalic acid, and

(B) bis(4-beta-hydroxyethoxyphenyl) sulfone and ethylene glycol

the amount of said A reactants, in mole percent, being between about 15% to 100% isophthalic acid and 85% to 0% terephthalic acid, the amount of said bis(4-beta-hydroxyethoxyphenyl) sulfone being at least 15 and up to 90 mole percent of the combined amounts of said A reactants and the combined amounts of said B reactants being about 110% to about 300% of the combined amount of said A reactants, said polyester having an $O_2$ and $CO_2$ permeabilities which are, respectively, less than 8 and less than 58 cc.mil/100 in$^2$.day.atm. on an unoriented basis and a glass transition temperature greater than 75° C.

## 4,110,316
## PROCESS FOR PREPARING POLY(ETHYLENE TEREPHTHALATE)

Robert Ray Edging, Kinston, and Lien-Mow Lee, Greenville, both of N.C., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 14, 1977, Ser. No. 787,605
Int. Cl.[2] C08G *63/18*
U.S. Cl. 526—68 5 Claims

1. In a continuous direct esterification and polymerization process wherein a feed of ethylene glycol and terephthalic acid in molar proportions of 1.5 to 4.0 glycol to 1.0 terephthalic acid is heated in reaction product at about 280° to 315° C and about atmospheric pressure to esterify the terephthalic acid and form an ester reaction product having an average degree of polymerization of 2 to 10, the ester product is heated at 250° to 300° C and low absolute pressure in a continuous polymerizer to form a prepolymer, and the prepolymer is heated at 270° to 305° C and substantially lower absolute pressure in a finisher polymerizer to form a polymer for spinning into filaments; the improvement for continuously recovering and reusing ethylene glycol from vapors formed in the polymerizers which comprises,

(a) conducting vapors of ethylene glycol and water from the continuous polymerizer into a spray condenser at the pressure in the polymerizer, spraying the vapors with ethylene glycol liquid containing less than 10 weight percent water to condense substantially all of the vapors, combining the condensate with ethylene glycol liquid containing less than 3 weight percent water to form ethylene glycol liquid containing less than 10 weight percent water for use in spraying the vapors and for reacting with terephthalic acid to form ester reaction product;

(b) conducting vapors of ethylene glycol and water from the finisher polymerizer into a spray condenser at the pressure in the finisher polymerizer, spraying the vapors with ethylene glycol liquid containing less than 3 weight percent water to condense substantially all of the vapors, combining the condensate with ethylene glycol liquid containing less than 1 weight percent water to form ethylene glycol liquid containing less than 3 weight percent water for use in spraying the vapors and for combining with the condensate produced in condenser system (a), the glycol containing less than 1 weight percent water being added at a rate of about 0.4 to 1.15 mole of glycol per mole of ethylene terephthalate in the polymer produced; and

(c) continuously transferring ethylene glycol liquid from finisher condenser system (b) to system (a), and from system (a) to the esterification reaction, at rates determined by the rate at which ethylene glycol is used in the esterification reaction.

## 4,110,317
## URETHANE COATING COMPOSITION AND PROCESS

James F. Moraveck, Shelton, Conn., assignor to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 235,800, Mar. 17, 1972, abandoned, which is a continuation-in-part of Ser. No. 33,101, Apr. 29, 1970, abandoned, and Ser. No. 685,309, Nov. 24, 1967, abandoned. This application Jan. 10, 1974, Ser. No. 432,273
Int. Cl.[2] C08G *18/48*
U.S. Cl. 528—77 7 Claims

1. A flexible urethane coating composition comprising a solvent and an isocyanate-terminated prepolymer comprising the reaction product of

(a) a polytetramethylene ether glycol having an average molecular weight between about 500 and about 700,
(b) an oxyalkylated triol having an average molecular weight between about 400 and about 1000, in an amount between about 8 and about 12 percent by weight based on the combined weight of said oxyalkylated triol and said polytetramethylene ether glycol, and
(c) an organic diisocyanate in a proportion sufficient to provide between about 1.2 and about 1.8 -NCO groups for each -OH group in said polytetramethylene ether glycol and said oxyalkylated triol.

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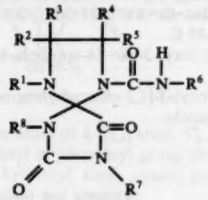
## 4,110,318
## POLYPARABANIC ACID DERIVATIVES

**Henning Giesecke, Cologne; Jürgen Hocker, Bergisch Gladbach, and Rudolf Merten, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Germany**

**Filed Jun. 8, 1977, Ser. No. 804,606**
**Claims priority, application Fed. Rep. of Germany, Dec. 1, 1976, 2654347**
**Int. Cl.² C08L *39/04***
**U.S. Cl. 528—73** **7 Claims**

1. Polyparabanic acid derivatives which contain the following recurring structural unit from 2 to 100 times



wherein $R^1$, $R^6$, $R^7$ and $R^8$ may be the same or different, and each represents an optionally substituted aliphatic, aliphatic-aromatic or aromatic radical, and $R^2$, $R^3$, $R^4$ and $R^5$ may be the same or different, and each represents hydrogen or an optionally substituted aliphatic, aliphatic-aromatic or aromatic radical.

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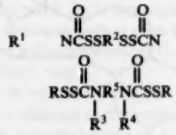
## 4,110,319
## THIOCARBAMATE ADDITIVES FOR SULFUR VULCANIZABLE POLYMERS

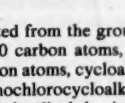
**John P. Lawrence, Stow, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Oct. 1, 1976, Ser. No. 728,692**
**Int. Cl.² C08C *19/20***
**U.S. Cl. 526—17** **8 Claims**

1. A sulfur vulcanizable diene polymer selected from the group consisting of natural rubber and synthetic diene polymers prepared from a monomer system containing diene monomer, said sulfur vulcanizable diene polymer having incorporated therein at least one thiocarbamate having the following structural formula



(II)



(III)

wherein R is selected from the group consisting of alkyl radicals having 1 to 20 carbon atoms, monochloroalkyl radicals having 3 to 20 carbon atoms, cycloalkyl radicals having 5 to 10 carbon atoms, monochlorocycloalkyl radicals having 5 to 10 carbon atoms, aralkyl radicals having 7 to 11 carbon atoms and aryl radicals having 6 to 10 carbon atoms, said aryl radicals optionally substituted with 1 or 2 radicals selected from the group consisting of alkyl radicals having 1 to 4 carbon atoms and the chloro radical, wherein the symbol

denotes a heterocyclic amino radical selected from the group consisting of pyrrolidino, piperidino, hexamethyleneimino, morpholino, 2,6-dimethylmorpholino, 2-methylpiperidino, 3-methylpiperidino, 4-methylpiperidino, 2,6-dimethylpiperidino, and 4-methylpiperazino, $R^2$ is selected from the group consisting of alkylene radicals conforming to the following structural formula

$$-(C_mH_{2m})-(R^6)_X-(C_nH_{2n})-$$

and arylene radicals having 6 to 10 carbon atoms, wherein X is 0 or 1, wherein $R^6$ is selected from the group consisting of —0—, —S— and phenylene, wherein when $R^6$ is phenylene or X is 0, *m* and *n* are positive whole numbers from 1 to 5 and wherein when $R^6$ is —0— or —S—, *m* and *n* are positive whole numbers from 2 to 5; $R^3$ and $R^4$ are selected from the group consisting of alkyl radicals having 1 to 20 carbon atoms, cyclohexyl radical; aralkyl radicals having 7 to 12 carbon atoms and aryl radicals having 6 to 10 carbon atoms; $R^5$ is selected from the group consisting of alkylene radicals having 2 to 6 carbon atoms and p-phenylene and wherein $R^3$ and $R^4$ can be joined to constitute with the bridging $R^5$ group and the attached nitrogen atoms, a heterocyclic diamino radical selected from the group consisting of piperazino, 2,5-dimethylpiperazino, homopiperazino, and 4,4'-trimethylenedipiperidino.

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## 4,110,320
## METHOD OF FRACTIONATING AND SEPARATING PROTEINS

**Friedrich von der Haar, Bovenden, Germany, assignor to Max-Planck-Gesellschaft zur Förderung der Wissenschaften E.V., Göttingen, Germany**

**Filed May 11, 1977, Ser. No. 796,050**
**Claims priority, application Fed. Rep. of Germany, May 24, 1976, 2623276**
**Int. Cl.² A23J *1/00***
**U.S. Cl. 260—112 R** **4 Claims**

1. In a method for the fractionation and separation of proteins by adsorption on an organic gel and elution with a descending ammonium sulfate gradient, the improvement comprising treating a solution of the proteins with ammonium sulfate down to a concentration which is from 5 to 15% below the concentration normally required for precipitation of said proteins, mixing the solution obtained with unsubstituted agarose gel, whereby the proteins are precipitated onto the agarose gel, and then fractionally eluting the latter.

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## 4,110,321
## SYNTHETIC TRIDECAPEPTIDE [Gln⁴]-NEUTROTENSIN HAVING HORMONAL ACTIVITY

**Karl A. Folkers, 6406 Mesa Dr., Austin, Tex. 78746**

**Continuation-in-part of Ser. No. 704,309, Jul. 12, 1976, abandoned. This application Apr. 6, 1977, Ser. No. 785,208**
**Int. Cl.² C07C *103/52***
**U.S. Cl. 260—112.5 R** **1 Claim**

1. A synthetic tridecapeptide having the structure pGlu-Leu-Tyr-Gln-Asn-Lys-Pro-Arg-Arg-Pro-Tyr-Ile-Leu-OH wherein all 13 amino acids are of the L-configuration.

4,110,322

## PEPTIDE DERIVATIVES AND PHARMACEUTICAL COMPOSITIONS CONTAINING SAME

Hendrik Marie Greven, Heesch, and David de Wied, Bilthoven, both of Netherlands, assignors to Akzona Incorporated, Asheville, N.C.

Filed Jun. 27, 1977, Ser. No. 810,277
Claims priority, application Netherlands, Jul. 12, 1976, 7607683
Int. Cl.[2] C07C *103/51;* A61K *37/00;* C07G *7/00*
U.S. Cl. 260—112.5 R 34 Claims

1. Compounds of the formula: A-L-B-D-Lys-L-Phe-Gly-(L or D)Lys-L-Pro-L-Val-Gly-L-Lys-L-Lys-X and their functional derivatives, wherein:

A is an N-terminal chain prolongation selected from the group consisting of:

(1) hydrogen, and

(2) the N-acyl radicals derived from:

(a) alkyl carboxylic acids having from one to about six carbon atoms,

(b) aralkyl carboxylic acids having from seven to about ten carbon atoms,

(c) amino acids selected from the group consisting of Met, Met(→O), Met (→$O_2$), Glu, Ser, His, Phe, Arg, Lys, Trp, Gly, Val, Leu, Ala, Ileu, β-Ala, (α-Me) Ala, Pro, Tyr, and Thr,

(d) peptides comprising two or three α-amino acids,

(e) the N-alkylcarbonyl or N-aralkylcarbonyl derivatives of said amino acids, and

(f) the N-alkylcarbonyl or N-aralkylcarbonyl derivatives of said peptides,

wherein the alkyl moiety in (e) and (f) has from one to about six carbon atoms, and wherein the aralkyl moiety in (e) and (f) has from seven to about ten carbon atoms;

B is an amino acid residue selected from the group consisting of Phe, Trp, Tyr and —NH—$CHR_1$—CO—, wherein $R_1$ is hydrogen or alkyl from one to about six carbon atoms; and

X is a member selected from the group consisting of hydroxy, esterified hydroxy radicals of from one to eighteen carbon atoms, unsubstituted amino radicals, and substituted amino radicals selected from the group consisting of mono-alkyl (one to six carbons) amino, dialkyl-(one to six carbons) amino radicals, and radicals derived from amino acids or peptides having the sequence 17, 17-18, 17–19, up to and including 17-24 of the ACTH molcule, or a C-terminal ester o amide thereof, with the proviso that Arg may be replaced by Lys.

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4,110,323

## CONVERSION OF 2-DIALKYLAMINO-3H-AZEPINES INTO EPSILON CAPROLACTAMS

Sylvain A. R. Dewaele, Evergem, Belgium, assignor to s.a. Texaco Belgium n.v., Brussels, Belgium

Filed Nov. 15, 1976, Ser. No. 741,838
Claims priority, application United Kingdom, Nov. 19, 1975 [GB] 47581/75
Int. Cl.[2] C07D *201/02*
U.S. Cl. 260—239.3 A 2 Claims

1. A process for preparing epsilon caprolactams from 2-N,N-dialkylamino-3H azepines wherein the alkyl substituents contain from 1 to 6 carbon atoms, by the steps of:

(a) mixing each mole of said azepine to be hydrogenated, at 20°–30° C, with a solubilizing amount of 95% by weight of deoxygenated alkanol, to form a hydrogenation mixture.

(b) in the presence of between 0.1 to 5% by weight of a Group VIII (a) metal catalyst, said catalyst being selected from the group consisting of Raney nickel, Adam's catalyst and platinum or palladium on a solid-inert support.

(c) passing hydrogen gas through said hydrogenation mixture at 0° to 75° C, at atmospheric to 200 atmospheres of hydrogen until epsilon caprolactam is formed.

4,110,324

## NICOTINIC DERIVATIVES OF ESTRIOL

Nicolas Guéritée, 65, rue des Vignes, 75016 Paris, France

Continuation-in-part of Ser. No. 551,151, Feb. 19, 1975, Pat. No. 4,042,581. This application Oct. 29, 1976, Ser. No. 736,931
Claims priority, application United Kingdom, Feb. 26, 1974, 08712/74
Int. Cl.[2] C07J *43/00*
U.S. Cl. 260—239.5 3 Claims

1. The compound 3-methoxy-16α,17β-dinicotinoyloxy-1,3,5(10)-estratriene.

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4,110,325

## 21-(ACETYLOXY)-3-OXO-24-NORCHOLA-4,20(22)-DIENE-23-NITRILE AND INTERMEDIATES THERETO

George R. Lenz, Evanston, and John A. Schulz, Waukegan, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed Aug. 10, 1977, Ser. No. 823,372
Int. Cl.[2] C07J *21/00, 9/00*
U.S. Cl. 260—239.55 C 4 Claims

1. 21-(Acetyloxy)-3-oxo-24-norchola-4,20(22)-diene-23-nitrile.

3. 21-(Acetyloxy)-3-[1,2-ethanediylbis(oxy)]-24-norchola-5,20(22)-diene-23-nitrile.

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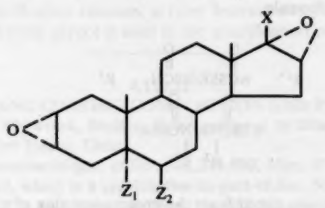
4,110,326

## ACYLATED DIEPOXY-ANDROSTANE AND A PROCESS FOR THE PREPARATION THEREOF

Zoltan Tuba, and Maria Marsai, both of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar Rt, Budapest, Hungary

Continuation-in-part of Ser. No. 702,050, Jul. 2, 1976, abandoned, and a continuation-in-part of Ser. No. 702,051, Jul. 2, 1976, abandoned, and a continuation-in-part of Ser. No. 709,325, Jul. 28, 1976, Pat. No. 4,071,515, and a continuation-in-part of Ser. No. 709,323, Jul. 28, 1976, Pat. No. 4,071,515. This application Jan. 25, 1977, Ser. No. 762,233
Claims priority, application Hungary, Jul. 15, 1975, 572
Int. Cl.[2] C07J *71/00, 43/00*
U.S. Cl. 260—239.55 R 24 Claims

1. A compound of the formula




wherein

X is halogen,

$Z_1$ and $Z_2$ are both hydrogen, or $Z_1$ is hydroxy and $Z_2$ is chlorine, or

$Z_1$ and $Z_2$ together stand for an α-epoxy group.

## 4,110,327
## 2,3 DIKETO-PIPERAZINO CARBONYLAMINO ALKANOIC ACIDS AND DERIVATIVES

Isamu Saikawa; Shuntaro Takano, both of Toyama; Chosaku Yoshida, Takaoka; Okuta Takashima, Toyama; Kaishu Momonoi, Shinminato; Seietsu Kuroda, Toyama; Miwako Komatsu, Toyama; Takashi Yasuda, Toyama, and Yutaka Kodama, Toyama, all of Japan, assignors to Toyama Chemical Co., Ltd., Tokyo, Japan

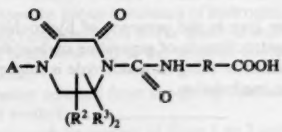
Division of Ser. No. 571,479, Apr. 24, 1975. This application Oct. 15, 1976, Ser. No. 732,860

Claims priority, application Japan, May 9, 1974, 49-50663; May 13, 1974, 49-52254; May 31, 1974, 49-60787; Aug. 13, 1974, 49-91996; Sep. 26, 1974, 49-109954; Dec. 3, 1974, 49-142499; Mar. 27, 1975, 50-37027

Int. Cl.[2] C07D *241/08, 401/12, 401/14, 413/12*

U.S. Cl. 544—385 8 Claims

1. A compound of the formula,



wherein

A is a hydrogen atom or a $C_{1-12}$ alkyl, $C_{2-4}$ alkenyl, phenyl, naphthyl, benzyl or phenethyl group alone or substituted by halogen, hydroxyl, nitro, cyano, pyrrolidino, piperidino, morpholino and acetoxy;

$R^2$ and $R^3$ are linked to the same carbon atom, and $R^2$ and $R^3$ individually are hydrogen, methyl, ethyl, propyl, butyl, pentyl, hexyl, heptyl, or octyl, and R is

wherein

$R_5$ is $C_{1-8}$ alkyl, $C_{5-7}$ cycloalkyl, $C_{5-6}$ cycloalkenyl, $C_{5-6}$ cycloalkadienyl, phenyl, naphthyl, benzyl, phenethyl, phenoxy, naphthoxy, $C_{1-2}$ alkylthio- $C_{1-2}$ alkyl, furyl, thienyl, oxazolyl, thiazolyl, isoxazolyl, isothiazolyl, imidazolyl, pyrazolyl, pyridyl, pyrazyl, pyrimidinyl, pyridazinyl, quinolyl, isoquinolyl, quinazolinyl, indolyl, indazolyl, 1, 3, 4-oxadiazolyl, 1,2,4-oxadiazolyl, 1,3,4-thiadiazolyl or 1,2,4-thiadiazolyl alone or substituted by halogen, hydroxy and nitro; $R_6$ is hydrogen and $R_5$ and $R_6$ together with the common carbon atom to which they are attached may form a $C_{6-7}$ cycloalkyl, $C_{5-6}$ cycloalkenyl or $C_{5-6}$ cycloalkadienyl ring;

a salt thereof selected from the group consisting of alkali metal salts, alkaline earth metal salts, ammonium salts, and salts with trimethylamine or dicyclohexylamine, or

a reactive derivative of the carboxyl group thereof, said derivative being conventional in the field of pencillins and cephalosporins for forming acid amides therewith, and said derivative being selected from the group consisting of acid halides, acid anhydrides, mixed acid anhydrides with organic or inorganic acids, active acid amides, acid cyanides and active esters.

## 4,110,328
## BIS-CARBAMYLGUANIDINOAZAALKANE ANTIMICROBIAL COMPOUNDS

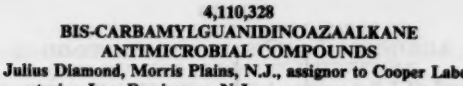
Julius Diamond, Morris Plains, N.J., assignor to Cooper Laboratories, Inc., Parsippany, N.J.

Continuation-in-part of Ser. No. 627,139, Oct. 30, 1975, abandoned. This application Oct. 26, 1976, Ser. No. 735,319

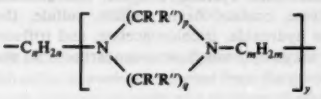
Int. Cl.[2] C07D *295/12, 241/06, 403/06, 413/14*

U.S. Cl. 544—380 26 Claims

1. A compound having the formula



wherein Y is a nitrogen-containing alkylene group having the structural formula



wherein:

$n = 2–4$

$m = 2–4$

$p = 2$

$q = 2$

$y = 1–2$

R′ and R″ are each hydrogen or $C_1–C_4$ alkyl and may be the same or different; and Z is selected from the group consisting of $C_1–C_{12}$ alkyl; di($C_1–C_{10}$ alkylamino)-$C_{10}–C_2$ alkyl, (1-piperidino)alkyl and (1-morpholino)alkyl having a total carbon content of $C_4–C_{12}$; $C_3–C_{12}$ alkenyl; $C_3–C_{12}$ alkynyl, $C_3–C_{12}$ cycloalkyl, $C_4–C_{12}$ cycloalkylalkyl, $C_6–C_{12}$ cycloalkenyl, $C_7–C_{14}$ cycloalkenylalkyl, $C_7–C_{12}$ polycycloalkyl, $C_8–C_{14}$ polycycloalkylalkyl, $C_7–C_{12}$ polycycloalkenyl, $C_8–C_{14}$ polycycloalkenylalkyl, $C_1–C_{10}$ alkoxy-$C_{10}–C_2$ alkyl having a total carbon content of $C_3–C_{14}$; $C_1–C_{10}$ alkylthio-$C_{10}–C_2$ alkyl having a total carbon content of $C_3–C_{14}$; phenoxy $C_2–C_6$ alkyl; phenylthio $C_2–C_6$ alkyl; $C_6–C_{14}$ aryl; $C_7–C_{14}$ aralkyl and $C_9–C_{14}$ arylcycloalkyl; $C_9–C_{12}$ benzocycloalkyl, and $C_6–C_{14}$ aryl and aralkyl substituted with one or more radicals selected from the group consisting of lower alkyl, trifluoromethyl, loweralkoxy, trifluoromethoxy, phenoxy, loweralkylthio, halo, nitro, cyano, $C_2–C_6$ alkanoyl, benzoyl, loweralkoxycarbonyl, diloweralkylamino, loweralkylsulfonyl, fluorosulfonyl and loweralkylsulfinyl; and pharmacologically acceptable addition salts of these compounds with acids.

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## 4,110,329
## METALLIC DERIVATIVES OF NEOPINONE KETAL

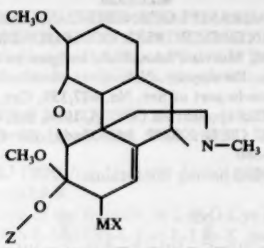
Henry Rapoport, and Randy B. Barber, both of Berkeley, Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Mar. 10, 1976, Ser. No. 665,601

Int. Cl.[2] C07F *15/00, 3/14, 5/00;* C07D *489/02*

U.S. Cl. 260—270 A 9 Claims

1. A compound represented by the following formula



where M is mercuric, platinum (II) or palladium (II), X is a suitable anion, selected from the group consisting of acetate, acetyllide, benzoate, bromate, bromide, carbonate, chlorate, chloride, chromate, cyanide, fluoride, fluorosilicate, iodate, iodide, nitrate, oxalate, oxide, sulfate, sulfide, thiocyanate perchlorate hydroxide, trichloroacetate, and trifluoroacetate, Z is lower alkyl, cycloalkyl, or monocarbocyclic aralkyl.

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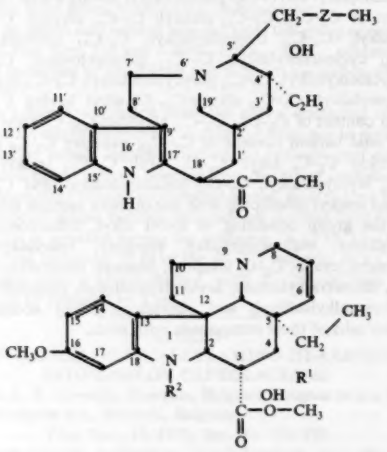
**4,110,330**

## 5'-ACETONYLVINCRISTINE AND RELATED COMPOUNDS

**Charles J. Barnett; Richard A. Bimm, both of Indianapolis, and George C. Cullinan, Trafalgar, all of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Filed May 27, 1977, Ser. No. 801,132**
**Int. Cl.² C07D *519/04***
**U.S. Cl. 260—287 B** **7 Claims**

1. Compounds of the formula



wherein Z is CO or CHOH, $R^2$ is H or CHO and $R^1$ is OH or acetoxy and pharmaceutically-acceptable salts thereof.

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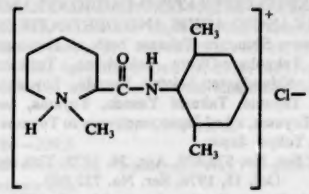
**4,110,331**

## METHOD OF PRODUCING THE HYDROCHLORIDE OF N-METHYL PIPERIDINE-2-CARBOXYLIC ACID-2,6-XYLIDIDE

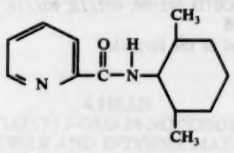
**Bror Gösta Pettersson, Karlskoga, Sweden, assignor to AB Bofors, Bofors, Sweden**

**Filed Jun. 15, 1977, Ser. No. 806,632**
**Claims priority, application Sweden, Jun. 22, 1976, 7607114**
**Int. Cl.² C07D *211/60, 211/02***
**U.S. Cl. 260—293.77** **18 Claims**

1. A method of producing the hydrochloride of N-methyl piperidine-2-carboxylic acid-2,6-xylidide of the formula:



which comprises hydrogenating picolinic acid-2,6-xylidide of the formula:



in the pyridine ring in the presence of hydrochloric acid to provide the hydrochloride of piperidine carboxylic acid xylidide which thereafter using formaldehyde is subjected to catalytic reductive methylation.

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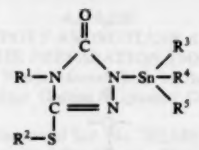
**4,110,332**

## 1-TRIORGANOSTANNYL-3-ORGANOTHIO-4-SUBSTITUTED-1,2,4-DELTA²-TRIAZOLIDIN-5-ONES

**Laroy H. Edwards, Napa, Calif., assignor to Chevron Research Company, San Francisco, Calif.**

**Filed May 5, 1977, Ser. No. 794,324**
**Int. Cl.² C07F *7/22*; A01N *9/12***
**U.S. Cl. 260—299** **6 Claims**

1. A compound of the formula



wherein $R^1$ is alkyl of 1 to 4 carbon atoms, alkenyl of 2 to 3 carbon atoms, cycloalkyl of 5 to 6 carbon atoms, phenyl or benzyl substituted with 1 to 2 of the same or different substituents selected from fluoro, chloro, bromo and alkyl of 1 to 4 carbon atoms; $R^2$ is alkyl of 1 to 4 carbon atoms, alkenyl of 2 to 3 carbon atoms, benzyl or benzyl substituted with 1 to 2 of the same or different substituents selected from fluoro, chloro, bromo and alkyl of 1 to 4 carbon atoms; and $R^3$, $R^4$ and $R^5$ individually are alkyl of 1 to 6 carbon atoms, phenyl or benzyl.

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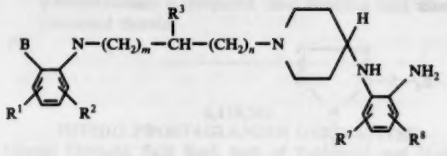
**4,110,333**

## 1,3-DIHYDRO-1-[3-(1-PIPERIDINYL)PROPYL]-2H-BENZIMIDAZOL-2-ONES AND RELATED COMPOUNDS

**Jan Vandenberk, Beerse; Ludo E. J. Kennis, Vosselaar; Marcel J. M. C. Van der Aa, Vosselaar, and Albert H. M. Th. Van Heertum, Vosselaar, all of Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium**

**Division of Ser. No. 687,139, May 17, 1976, Pat. No. 4,066,772, which is a continuation-in-part of Ser. No. 597,793, Jul. 21, 1975, abandoned. This application Jul. 20, 1977, Ser. No. 817,400**
**Int. Cl.² C07D *417/06***
**U.S. Cl. 260—293.57** **1 Claim**

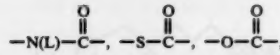
1. A chemical compound having the formula:



wherein:

$R^1$ and $R^2$ are each independently selected from the group consisting of hydrogen, halo, lower alkyl and trifluoromethyl;

B is a member selected from the group consisting of the bivalent radicals



—N=N— and —N=CH—, said L being a member selected from the group consisting of hydrogen, lower alkyl, lower alkylcarbonyl and lower alkenyl, and said bivalent radicals being attached to the benzene nucleus with their heteroatom;

$R^3$ is a member selected from the group consisting of hydrogen and methyl;

*m* and *n* are each an integer of from 1 to 2 inclusive; and

$R^7$ and $R^8$ are each independently selected from the group consisting of hydrogen, halo, lower alkyl and trifluoromethyl.

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**4,110,334**

**DERIVATIVES OF 1-OXA-3,8-DIAZA-SPIRO-[4,5]-DECANES**

**Norbert Mayer, Gersthofen; Gerhard Pfahler, Augsburg, and Hartmut Wiezer, Gersthofen; all of Germany, assignors to Hoechst Aktiengesellschaft, Frankurt am Main, Germany**

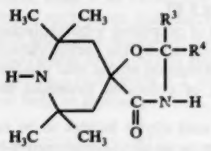
**Filed Feb. 9, 1977, Ser. No. 766,948**

**Claims priority, application Fed. Rep. of Germany, Feb. 14, 1976, 2606026**

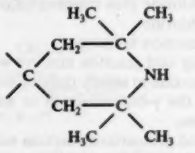
**Int. Cl.[2] C07D *498/10, 498/20***

**U.S. Cl. 260—293.66** **6 Claims**

1. A compound of the formula



wherein $R^3$ and $R^4$ each are identical or different substituents selected from the group consisting of hydrogen, alkyl- or isoalkyl of from 1–30 carbons, aryl of 6 or 10 carbons, unsubstituted or substituted by halogen or alkyl of 1–4 carbons, phenylalkyl of 7–10 carbons, or $R^3$ and $R^4$ are, together with the attached carbon, cycloalkyl of 4–15 carbons, unsubstituted or substituted by $C_1$ – $C_4$ alkyl, or a group of the formula



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**4,110,335**

**PROCESS FOR PREPARING DISALTS OF 3,4-DIMERCAPTOISOTHIAZOLE-5-CARBONITRILE [AND RELATED PRODUCTS THEREFROM]**

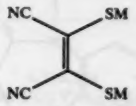
**Susan Anne Vladuchick, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 704,973, Jul. 13, 1976, Pat. No. 4,066,656. This application Apr. 25, 1977, Ser. No. 790,856**

**Int. Cl.[2] C07D *275/02***

**U.S. Cl. 260—302 S** **8 Claims**

1. A process for preparing a disalt of the 3,4-dimercaptoisothiazole-5-carbonitrile comprising the step of contacting a 1,2-dimercaptomaleonitrile salt of the formula



where M is an alkali metal or bis[tetra (lower alkyl ammonium)], with sulfur in a solvent selected from the group consisting of alkanols, aqueous alkanols, and mixtures of alkanols with a dipolar aprotic solvent at a temperature of at least 50° C.

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**4,110,336**

**MONO-, DI- AND TRI-ESTERS OF THIOPHOSPHONIC ACID AND THEIR USE AS PESTICIDES**

**Hilmar Mildenberger, Kelkheim, Taunus; Gerhard Stahler, Frankfurt am Main, and Ludwig Emmel, Bergen-Enkheim, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

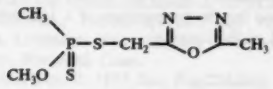
**Continuation of Ser. No. 411,748, Nov. 1, 1973, abandoned. This application Jul. 19, 1977, Ser. No. 816,968**

**Claims priority, application Fed. Rep. of Germany, Nov. 4, 1972, 2254042**

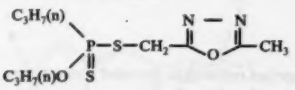
**Int. Cl.[2] C07F *9/40***

**U.S. Cl. 260—307 G** **4 Claims**

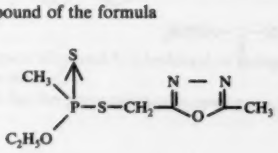
1. A compound of the formula



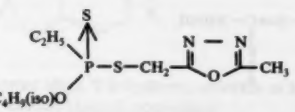
2. A compound of the formula



3. A compound of the formula



4. A compound of the formula

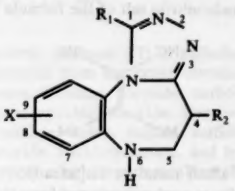


## 4,110,337
## TRIAZOLOBENZODIAZEPINES

**Etienne Szarvasi, Charbonnieres-les-Bains, France, assignor to Lipha, Lyonnaise Industrielle Pharmaceutique, Lyons, France**

**Filed Mar. 8, 1974, Ser. No. 449,477**
**Claims priority, application France, Mar. 9, 1973, 73.08510; Oct. 4, 1973, 73 35522; Nov. 22, 1973, 73 41583**
**Int. Cl.[2] C07D *243/12, 487/04***
**U.S. Cl. 260—308 R** **19 Claims**

1. 4H-5,6-dihydro-[4,3-a]-s-triazolo-1,5-benzodiazepines represented by the general formula:



and pharmaceutically acceptable acid addition salts thereof, wherein X is hydrogen, a halogen atom in the 8- or 9-position, or a lower alkoxy group; $R_1$ is a phenyl radical optionally substituted by a halogen atom or lower alkyl group in the para position or by a lower alkoxy group in the para or ortho position, a naphthyl radical, or a 2-furyl or 2-thienyl radical; and $R_2$ is hydrogen or a lower alkyl group.

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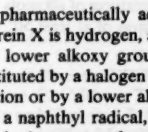
## 4,110,338
## PRODUCT AND PREPARATION OF 1H-TETRAZOLE-5-THIOL DERIVATIVES

**Takashi Kamiya, Suita; Kunihiko Tanaka, Toyonaka, and Youichi Shiokawa, Takatsuki, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan**

**Filed Oct. 29, 1974, Ser. No. 518,956**
**Claims priority, application Japan, Oct. 31, 1973, 48-123118; Jun. 19, 1974, 49-70440**
**Int. Cl.[2] C07D *257/04;* A61K *31/54***
**U.S. Cl. 260—308 D** **7 Claims**

1. A process for the preparation of a 1-substituted 1H-tetrazole-5-thiol of the formula:



(I)

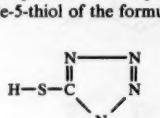
which comprises reacting at elevated temperature a substituted thiosemicarbazide of the formula:

(II)

with a compound of the formula:

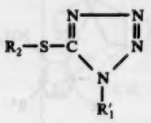
(III)

to give a N,S-disubstituted thiosemicarbazine of the formula:



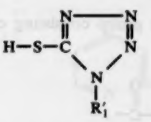
(IV)

subjecting at lower temperature the resultant compound (IV) to diazotization to give a 5-aralkylthio-1H-tetrazole of the formula:



(V)

and reacting at elevated temperature the resultant compound (V) with a slightly molar excess of Friedel Crafts' catalyst to give a compound of the formula:



(I')

and when desired, converting the resultant compound (I') into its salt, wherein

$R_1'$ is alkyl of 1–6 carbon atoms
$R_2$ is aralkyl, and
X is a residue of an acid.

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## 4,110,339
## 4-(DI-n-PROPYL)AMINO-1,3,4,5-TETRAHYDROBENZ[cd]INDOLE

**Nicholas J. Bach, and Edmund C. Kornfeld, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Filed Nov. 25, 1977, Ser. No. 854,878**
**Int. Cl.[2] C07D *209/90***
**U.S. Cl. 260—326.9** **3 Claims**

1. 4-(Di-n-propyl)amino-1,3,4,5-tetrahydrobenz[cd]indole and pharmaceutically-acceptable acid addition salts thereof.

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## 4,110,340
## PROCESS FOR PREPARING LOWER LACTAMS FROM ALLYLIC HALIDE SUBSTRATES

**John F. Knifton, Austin, Tex., assignor to Texaco Inc., New York, N.Y.**

**Filed Nov. 26, 1976, Ser. No. 745,019**
**Int. Cl.[2] C07D *201/02, 207/26***
**U.S. Cl. 260—326.5 FL** **18 Claims**

1. The process of preparing γ-butyrolactam or an alkyl-substituted-γ-butyrolactam by the carbonylation of allylic halides having three to 10 carbon atoms, said halides selected from the group consisting of chlorides, bromides and iodides by the procedure of:

(a) Admixing said allylic halides to be carbonylated to γ-butyrolactam or an alkyl-substituted-γ-butyrolactam with at least a stoichiometric amount of amine coreactant selected from the group consisting of ammonia and primary amines having 1 to 12 carbon, with at least a catalytic amount of rhodium catalyst selected from the group consisting of:
Chlorobis (ethylene) rhodium(I) dimer
Chlorotris (triphenylphosphine) rhodium(I)
Chlorocarbonylbis (triphenylphosphine) rhodium(I)
Rhodium tris (acetylacetonate)
Rhodium chloride plus triphenylphosphine and
Rhodium chloride
to form a reaction mixture;

(b) Pressurizing said reaction mixture with at least sufficient carbon monoxide to satisfy the stoichiometry of the carbonylation to the γ-butyrolactam or an alkyl-substituted-γ-butyrolactam;

(c) Heating said pressurized reaction mixture between about 20° C. and 250° C. and higher, until said allylic halide is

carbonylated and γ-butyrolactam or an alkyl-substituted-γ-butyrolactam is prepared, and isolating said lactams contained therein.

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**4,110,341**

## DITHIO PROSTAGLANDIN DERIVATIVES

**Masaki Hayashi; Seiji Kori, both of Takatsuki, and Hajimu Miyake, Suita, all of Japan, assignors to Ono Pharmaceutical Company, Osaka, Japan**

**Filed Feb. 4, 1977, Ser. No. 765,580**

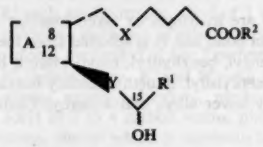
**Claims priority, application United Kingdom, Feb. 10, 1976, 05145/76**

**Int. Cl.² C07D *339/04***

**U.S. Cl. 260—327 C** **11 Claims**

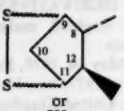
1. A compound of the formula:

(IV)



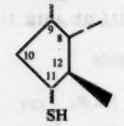
wherein A represents a grouping of the formula:

(VA)



or

(VB)



X represents ethylene or cis-vinylene, Y represents ethylene or trans-vinylene, $R^1$ represents a straight- or branched-chain alkyl group containing from 4 to 10 carbon atoms, and $R^2$ represents a hydrogen atom or a straight- or branched-chain alkyl group containing from 1 to 12 carbon atoms and cyclodextrin clathrates of such acids and esters and, when $R^2$ represents a hydrogen atom, non-toxic salts thereof, the bonds attaching the epidithio radical to the carbon atoms in the 9- and 11-positions in the grouping of formula VA being either both in α-configuration or both in β-configuration.

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**4,110,342**

## AZIDOMETHYLARYLACETIC ACIDS AND ESTERS THEREOF

**Eric C. Bigham, Waterford, Conn., assignor to Pfizer Inc., New York, N.Y.**

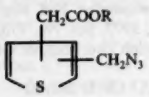
**Filed Sep. 16, 1977, Ser. No. 833,906**

**Int. Cl.² C07D *333/24*; A01N *9/00***

**U.S. Cl. 260—332.2 A** **4 Claims**

1. A compound of the formula

(I)



wherein R is hydrogen or $R^O$ where $R^O$ is methyl or ethyl.

**4,110,343**

## BISFLUORAN CHROMOGENIC COMPOUNDS, PREPARATION THEREOF, AND PRESSURE-SENSITIVE COPY SYSTEMS EMPLOYING SAME

**David N. Vincent, Glenview, and Cheng Hsiung Chang, Chicago, both of Ill., assignors to Champion International Corporation, Stamford, Conn.**

**Division of Ser. No. 430,141, Jan. 2, 1974, Pat. No. 4,012,419, which is a division of Ser. No. 329,294, Feb. 5, 1973, Pat. No. 3,821,010. This application Feb. 4, 1977, Ser. No. 765,693**

**Int. Cl.² C07D *493/22***

**U.S. Cl. 260—335** **8 Claims**

1. 7,7'-methylene-bis(3-diethylaminofluoran).

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**4,110,344**

## ADSORBENT FOR POLYNUCLEAR AROMATIC COMPOUNDS

**David L. Stalling; James N. Huckins, and William Allen Smith, all of Columbia, Mo., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.**

**Division of Ser. No. 733,500, Oct. 18, 1976. This application Oct. 18, 1977, Ser. No. 843,193**

**Int. Cl.² C07D *319/08***

**U.S. Cl. 260—340.3** **2 Claims**

1. A process for separation of polynuclear aromatic compounds selected from the group consisting of chlorinated dibenzodioxins, chlorinated naphthalenes, chlorinated dibenzofurans, and mixtures thereof from mixtures containing said compounds comprising contacting said mixtures with an adsorbent consisting essentially of powdered charcoal coated on a support material consisting of polyurethane foam.

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**4,110,345**

## 2,2-DIFLUORO-1,3-BENZODIOXOLE-5-(α-ALKYL)-ACETIC ACIDS, AND THEIR USE FOR THE PREPARATION OF INSECTICIDES AND ACARICIDES

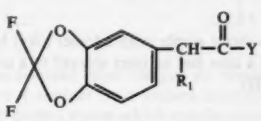
**Gerald Berkelhammer, Princeton, N.J., and Venkatamaran Kameswaran, Levittown, Pa., assignors to American Cyanamid Company, Stamford, Conn.**

**Filed Mar. 3, 1977, Ser. No. 774,088**

**Int. Cl.² C07D *317/44***

**U.S. Cl. 260—340.5 R** **9 Claims**

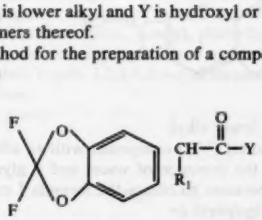
1. A compound having the formula:



wherein $R_1$ is lower alkyl and Y is hydroxyl or halogen, and the optical isomers thereof.

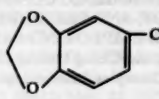
6. A method for the preparation of a compound having the formula (I)

(I)

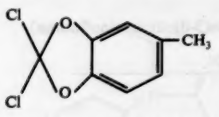


wherein $R_1$ is lower alkyl, Y is hydroxy, chlorine or bromine, and the optical isomers thereof, comprising

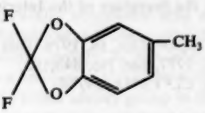
reacting a compound of formula (II)


(II)

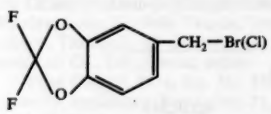
with a chlorinating agent in the presence of an inert solvent to obtain a compound of formula (III)


(III)

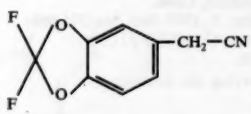
reacting the compound of formula (III) with antimony trifluoride in the presence of an inert solvent to obtain a compound of formula (IV)


(IV)

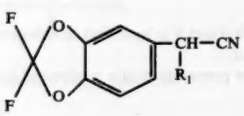
reacting the formula (IV) compound with bromine, chlorine or N-bromosuccinimide in the presence of an inert solvent and a free radical initiator to obtain a compound of formula (V)


(V)

converting the above formula (V) compound with an alkali metal cyanide to the corresponding acetonitrile of formula (VI)


(VI)

alkylating the above nitrile with a lower alkyl halide in the presence of a base and an inert solvent to a compound of formula (VII)


(VII)

wherein $R_1$ is lower alkyl,

hydrolyzing formula (VII) compound with an alkali metal hydroxide in the presence of water and a glycol at an elevated temperature to obtain the formula I compound wherein Y is hydroxyl or

reacting the formula I product of the reaction with thionyl chloride or thionyl bromide in the presence of an inert solvent to produce a formula I compound wherein Y is chlorine or bromine.

**4,110,346**

## TETRAMETHYL CHROMANYL PENTANE DERIVATIVES

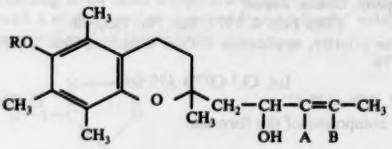
**Ka-Kong Chan, Stanhope, and Gabriel Saucy, Essex Fells, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Division of Ser. No. 587,570, Jun. 17, 1975, Pat. No. 4,016,178. This application Dec. 8, 1976, Ser. No. 746,982**

**Int. Cl.[2] C07D *311/72***

**U.S. Cl. 260—345.5** **7 Claims**

1. A compound of the formula



wherein A and B are hydrogen or taken together form a carbon to carbon bond and R is selected from the group consisting of benzyl, benzhydryl, trityl, t-butyl, tetrahydropyranyl, trimethylsilyl, dimethyl-tertiary-butylsilyl,alpha-loweralkoxy-lower alkyl, and 4-methyl-5,6-dihydro-2H-pyranyl.

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**4,110,347**

## CHROMAN DERIVATIVES

**Eric Alfred Watts, Harlow, England, assignor to Beecham Group Limited, Great Britain**

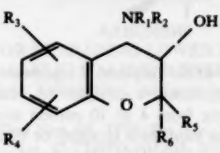
**Division of Ser. No. 577,614, May 14, 1975, Pat. No. 4,048,317. This application Jan. 6, 1977, Ser. No. 757,353**

**Claims priority, application United Kingdom, May 31, 1974, 24348/74**

**Int. Cl.[2] C07D *311/02;* A01K *31/35***

**U.S. Cl. 260—345.2** **18 Claims**

1. A compound of the formula


(I)

or a pharmaceutically acceptable acid addition salt thereof wherein

$R_1$ is hydrogen or a hydrocarbon of 1 to 9 carbon atoms unsubstituted or substituted by hydroxyl or alkoxyl of 1 to 6 carbon atoms;

$R_2$ is hydrogen or alkyl of 1 to 6 carbon atoms;

$R_3$ together with $R_4$ form a —CH=CH—CH=CH— or —$CH_2$—$CH_2$—$CH_2$—$CH_2$— ring system;

$R_5$ is hydrogen, alkyl of 1 to 6 carbon atoms or phenyl; and

$R_6$ is hydrogen, alkyl of 1 to 6 carbon atoms or phenyl.

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**4,110,348**

## 7,7'-DIAMINO DERIVATIVES OF 2,2'-SPIRODIBENZOPYRANES

**Hans Baumann, Wachenheim, and Andreas Oberlinner, Ludwigshafen, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

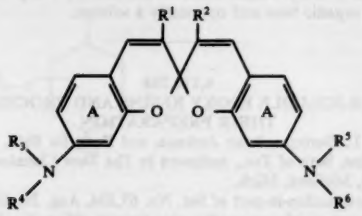
**Filed Mar. 1, 1977, Ser. No. 773,337**

**Claims priority, application Fed. Rep. of Germany, Mar. 19, 1976, 2611600**

**Int. Cl.[2] C07D *311/02***

**U.S. Cl. 260—345.2** **8 Claims**

1. A dye intermediate of the formula



where $R^1$ is hydrogen, alkyl of 1 to 12 carbon atoms, phenyl which is unsubstituted or substituted by alkyl of 1 to 4 carbon atoms, methoxy, ethoxy, chlorine or bromine, or phenylalkyl of 7 to 10 carbon atoms, $R^2$ is hydrogen or $R^1$ and $R^2$ together are dimethylene, trimethylene or tetramethylene, which are unsubstituted or substituted by alkyl of 1 to 12 carbon atoms, $R^3$ and $R^5$ each are hydrogen, alkyl of 1 to 12 carbon atoms, cyano-, chlorine-, methoxy- or ethoxy-substituted alkyl of 2 to 4 carbon atoms, cycloalkyl of 5 to 7 carbon atoms, phenylalkyl of 7 to 10 carbon atoms, $R^4$ and $R^6$ each are alkyl of 1 to 12 carbon atoms, cyano-, chlorine-, methoxy- or ethoxy-substituted alkyl of 2 to 4 carbon atoms, phenylalkyl of 7 to 10 carbon atoms, phenyl which is unsubstituted or substituted by alkyl of 1 to 4 carbon atoms, chlorine or bromine, and the substituents $R^3$, $R^4$, $R^5$ and $R^6$ may be identical or different and the rings A and A′ are unsubstituted or substituted by alkyl of 1 to 3 carbon atoms.

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**4,110,349**

## TWO-STEP METHOD FOR THE ALKENYLATION OF MALEIC ANHYDRIDE AND RELATED COMPOUNDS

**Jermone Martin Cohen, University Heights, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio**

**Filed Jun. 11, 1976, Ser. No. 695,234**
**Int. Cl.² C07D *307/60***
**U.S. Cl. 260—346.74** **8 Claims**

1. In a method for preparing a substituted carboxylic acid or derivative thereof which comprises reacting (A) at least one substantially aliphatic hydrocarbon having about 30–300 carbon atoms and containing on olefinic bond but being otherwise substantially saturated with (B) about 0.3–2.0 moles, per mole of reagent A, of at least one of maleic acid, fumaric acid, itaconic acid, and anhydrides and esters of any of these acids, at least a part of the reaction taking place in the presence of chlorine, the improvement which comprises:

(I) Reacting reagent A with an amount of reagent B equal to about 30–90% of the amount required to afford the desired product, at a temperature within the range of about 100°–250° C. and in the presence of about 0–0.4 mole of chlorine per mole of reagent B; and subsequently

(II) Introducing additional reagent B sufficient to afford the desired product and continuing the reaction at a temperature within the range of about 170°–225° C. and in the presence of about 0.9–4 moles of added chlorine per mole of said additional reagent B;

the total amount of chlorine used in said method being substantially less than one mole per mole of reagent B.

**4,110,350**

## CATALYTIC OXIDATIVE PROCESS FOR PRODUCING MALEIC ANHYDRIDE

**Sumio Umemura; Kyoji Ohdan; Fumihiko Sakai; Yasuo Bando, and Harumi Ikezawa, all of Ube, Japan, assignors to Ube Industries, Ltd., Japan**

**Continuation of Ser. No. 623,448, Oct. 17, 1975, abandoned. This application Jul. 19, 1977, Ser. No. 816,916**
**Claims priority, application Japan, Oct. 22, 1974, 49-121009; Jul. 1, 1975, 50-80527**
**Int. Cl.² C07D *307/60***
**U.S. Cl. 260—346.75** **11 Claims**

1. A process for producing maleic anhydride by catalytic oxidation of an aliphatic straight chain unsaturated hydrocarbon having 4 to 6 carbon atoms, which comprises the step of contacting a feed-gas mixture comprising said unsaturated hydrocarbon and oxygen in the vapor phase with a catalyst consisting essentially of oxides defined by the following formula:

$$VP_aTi_bX_cO_d$$

wherein X is at least one element selected from the group consisting of sodium, calcium, magnesium, iron, zirconium, boron, maganese, silver and molybdenum, $a$ is 1.0 to 5.0, $b$ is 2.0 to 12.0 and $c$ is 0 to 1.0 and wherein d is a positive number within the range of 8 to 40 satisfying the average valency of the vanadium, phosphorus, titanium and element "X;" said catalyst being prepared by the steps of calcining a mixture of a vanadium-containing compound and titanium dioxide at a temperature of 650° C to 1,500° C, incorporating into the calcined mixture a phosphorus-containing compound or both a phosphorus-containing compound and a compound containing the element "X" set forth above, and, then, heating the resulting mixture at a temperature of 300° C to 600° C.

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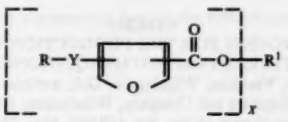
**4,110,351**

## HYPOLIPIDEMIC AGENTS RO- OR RS- SUBSTITUTED FUROIC ACIDS, ESTERS AND SALTS

**Roger Alan Parker, Cincinnati, Ohio, assignor to Richardson-Merrell Inc., Wilton, Conn.**

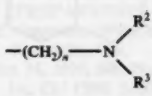
**Filed Apr. 2, 1973, Ser. No. 347,064**
**Int. Cl.² C07D *307/68***
**U.S. Cl. 260—347.2** **12 Claims**

1. A compound of the formula



wherein Y is selected from oxygen or divalent sulfur; R is selected from a straight or branched alkyl chain containing from 10 to 20 carbon atoms which may be saturated or may be unsaturated containing from 1 to 4 double bonds; $R^1$ is selected from hydrogen, a straight or branched lower alkyl group of from 1 to 6 carbon atoms, benzyl, phenethyl, pyridylmethyl, alkan-poly-yl containing from 3 to 6 carbon atoms and from 2 to 6 univalent bonds, 1,2,3,4,5,6-cyclohexanehexayl or Z; Z is selected from:

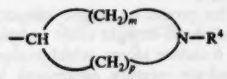
(A) the group:



wherein $n$ is an integer of 2 or 3; $R^2$ is selected from a straight or branched lower alkyl group of from 1 to 4

carbon atoms or an alkylcarbonyl radical wherein the alkyl moiety contains from 1 to 4 carbon atoms; $R^3$ is selected from hydrogen, a straight or branched lower alkyl group of from 1 to 4 carbon atoms with the proviso that when $R^3$ is hydrogen, $R^2$ is alkylcarbonyl; or when $R^2$ is other than alkylcarbonyl, $R^2$ and $R^3$ taken together with the nitrogen atom to which each is attached from a monocyclic heterocyclic group selected from pyrrolidino, piperidino, morpholino and piperazino; or

(B) the group:



wherein the sum of the integers as represented by *m* and *p* is equal to from 3 to 5; $R^4$ is selected from a straight or branched lower alkyl chain of from 1 to 4 carbon atoms; X is an integer of from 1 to 6 with the proviso that when $R^1$ is selected from alkan-poly-yl, X is equal to from 2 to 6 and when $R^1$ is 1,2,3,4,5,6-cyclohexanehexayl, X is equal to 6, and when $R^1$ is selected from other than alkan-poly-yl and 1,2,3,4,5,6-cyclohexanehexayl, X is equal to 1; or a pharmaceutically acceptable salt thereof.

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**4,110,352**

## BORIDE CATALYST FOR EPOXIDIZING OLEFINIC COMPOUNDS

**Robert Malone Gipson, Austin, Tex., assignor to Texaco Development Corporation, New York, N.Y.**

**Division of Ser. No. 565,004, Apr. 4, 1975, Pat. No. 4,038,290. This application Jan. 21, 1977, Ser. No. 761,159**

**Int. Cl.[2] C07D *301/20***

**U.S. Cl. 260—348.29** **2 Claims**

1. A method for the liquid phase epoxidation of an olefin having from about 2 to about 60 carbon atoms with an organic hydroperoxide comprising the step of:

intimately contacting said olefin with said organic hydroperoxide at lower temperatures of about 25° to about 200° C. and pressures sufficient to maintain the product and reactants substantially in liquid phase in the presence of a catalytically effective amount of a binary boride of boron and uranium.

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**4,110,353**

## PROCESS FOR THE PRODUCTION OF TETRAHYDROANTHRAQUINONES

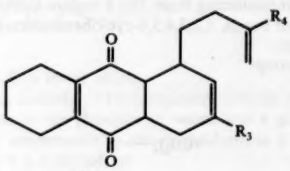
**Lawrence G. Vaughan, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 417,804, Nov. 21, 1973. This application Dec. 8, 1977, Ser. No. 858,664**

**Int. Cl.[2] C07C *49/68***

**U.S. Cl. 260—369** **16 Claims**

1. A process for the preparation of a 5,6,7,8-tetrahydro-1-alkenyl-9,10-anthraquinone which comprises oxidizing a starting compound of the formula



where $R_3$ is an alkyl group of 1 to 8 carbon atoms or hydrogen and $R_4$ is an alkyl group of 1 to 8 carbon atoms or hydrogen at from 20° to 100° C. in the presence of molecular oxygen, from 0.1% to 25% by weight based on the starting compound of a strong organic base and optionally a solvent.

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**4,110,354**

## WATER-SOLUBLE EPOXY RESINS AND PROCESS FOR THEIR PREPARATION

**James L. Bertram, Lake Jackson, and Pong Su Shih, College Station, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.**

**Continuation-in-part of Ser. No. 67,234, Aug. 26, 1970, abandoned, which is a continuation-in-part of Ser. No. 852,061, Aug. 21, 1969, abandoned, which is a continuation-in-part of Ser. No. 782,611, Dec. 10, 1968, abandoned. This application Sep. 28, 1973, Ser. No. 401,915**

**Int. Cl.[2] C07D *301/28, 303/24***

**U.S. Cl. 260—348.14** **2 Claims**

1. A process for the preparation of a water-soluble mixture of glycidyl ethers of glycerine wherein

(A) glycerine is reacted in a vessel with from about 2.0 to about 2.6 moles of epichlorohydrin per mole of glycerine in the presence of a catalyzing amount of a Lewis Acid catalyst wherein the reaction is conducted in an organic solvent in which the glycerine is at least partially soluble and in which the chlorohydrin ether reaction product will form a single phase, said solvent being present in a quantity of from about 20% to about 90% by weight of the quantity of glycerine employed, the reaction being conducted at a temperature of from 0° C to the reflux temperature of the solvent phase;

(B) dehydrohalogenating, at a temperature below about 110° C, the chlorohydrin ether reaction product with from about 70 to about 95% of the theoretical amount of NaOH in the presence of ethylene dichloride in a quantity of 50–95% by weight based upon the initial weight of glycerine employed plus the total quantity of solvent employed in this dehydrohalogenation step;

(C) separating the water resulting from the dehydrohalogenation reaction and caustic addition by azeotropic distillation, and

(D) separating the salt from the resulting solution;

with the proviso that when the solvents employed in steps (A) and (B) are different, the solvent in (A) is removed before performing step (B); wherein said mixture of glycidyl ethers of glycerine contains less than 2% by volume of insolubles as determined by placing 9 ml of the resin in water to a total volume of 100 ml, agitating until no more resin is apparently going into solution, thereafter centrifuging to remove the insolubles and calculating the percent insolubles by the following equation:

$$\frac{\text{milliliters of insolubles}}{9} \times 100 = \%\ \text{insolubles by volume}$$

and wherein said mixture contains from about 1.5 to about 8% organic chloride and an epoxide content of from about 28.4% to about 33% by weight.

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**4,110,355**

## ANTHRAQUINONE COMPOUNDS USEFUL IN PHOTOGRAPHIC PROCESSES

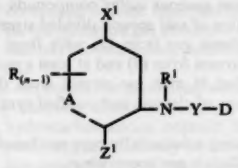
**Stanley M. Bloom, Waban, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Continuation-in-part of Ser. No. 318,227, Dec. 26, 1972, abandoned, which is a division of Ser. No. 655,338, Jul. 24, 1967, Pat. No. 3,751,406. This application May 23, 1973, Ser. No. 363,354**

**Int. Cl.[2] C09B *1/50***

**U.S. Cl. 260—372** **11 Claims**

1. A compound of the formula



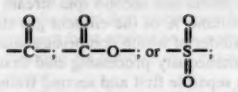
wherein:

A represents the atoms necessary to complete a benzene or naphthalene radical;

D is an anthraquinone dye moiety;

$Z^1$ is hydrogen or a substituent replaceable by an oxidized aromatic amino color developer in elimination-coupling reactions; said substituent being selected from the group consisting of chloro, bromo, carboxy, sulfo, hydroxy, alkoxy and hydroxyalkyl;

Y is the residue of an acid forming an amide with and reducing the basic character of the nitrogen atom to which it is bonded and is selected from the group consisting



$X^1$ is hydroxy or a primary, secondary or tertiary amino of the formula

wherein each $R^3$ is hydrogen, alkyl, phenyl, naphthyl, or each $R^3$ may be alkylene so that the $R^3$'s together with the nitrogen atom provide a heterocyclic ring having 5 or 6 carbon atoms or each $R^3$ may be a lower alkyl having a substituent chosen from the group consisting of a hydroxy substituent, a methoxyethoxy substituent, a polyglycoloxy substituent, a carboxy substituent, an ethoxycarboxy substituent, a benzyl substituent, a phenyl substituent, a sulfophenyl substituent, an acetylaminophenyl substituent, a succinylaminophenyl substituent or a furane substituent;

R is an anchoring substituent rendering the compound non diffusible said substituent containing a higher alkyl radical bonded to a single carbon atom of said aromatic nucleus formed by said A moiety;

$R^1$ is hydrogen or alkyl; and

*n* is 2 or *n* may be 1 when $X^1$ is a secondary or tertiary amino comprising an anchoring moiety rendering said compound non diffusible or $R^1$ is an alkyl radical providing such an anchoring moiety.

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**4,110,356**

## RECOVERY OF DOMESTIC OIL FROM SPENT CLAY

**Allan S. Hodgson, Berea, and Jerry F. P. Red, Cleveland, both of Ohio, assignors to SCM Corporation, New York, N.Y.**

**Filed Sep. 9, 1977, Ser. No. 831,958**

**Int. Cl.[2] C11B *13/04***

**U.S. Cl. 260—412.5** **4 Claims**

1. A process for treating crystalline clay that has been spent in the bleaching of domestic glyceride esters, said process comprising:

forming a dispersion of said spent clay and aqueous alkali, the temperature of said dispersion being at least about 80° C., the weight ratio of water to original spent clay in said dispersion being about 2–6:1,

the pH of said dispersion being in the range of about 10.5–10.8 for removal of glyceride ester as such from said spent clay; and

recovering resulting separated glyceride ester from said dispersion.

4. The process of claim 1 wherein said aqueous dispersion is saline, and it contains about 10% to 17% by weight sodium sulfate.

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**4,110,357**

## INTERMEDIATES FOR PREPARATION OF UNSATURATED ALCOHOLS

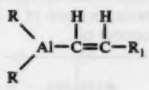
**Spencer C. Watson; Dennis B. Malpass, and G. Scott Yeargin, all of La Porte, Tex., assignors to Texas Alkyls, Inc., Deer Park, Tex.**

**Division of Ser. No. 665,836, Mar. 11, 1976. This application Nov. 8, 1976, Ser. No. 739,777**

**Int. Cl.[2] C07F *5/06***

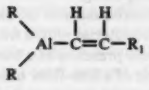
**U.S. Cl. 260—448 A** **7 Claims**

1. A coordinated complex comprising predominantly the cis-isomer of a compound having the generic formula:



wherein R can be the same or different and is selected from a straight or branched chain alkyl group having from 1 to 6 carbon atoms; $R_1$ is selected from a straight or branched chain alkyl group having from 1 to 20 carbon atoms; and at least a molar equivalent of a stabilizing Lewis base coordinating agent selected from ether, diether or polyether.

5. A process of preparing a stabilized predominantly cis-isomer compound having the following formula:



wherein R can be the same or different and is selected from a straight or branched chain alkyl group having 1 to 6 carbon atoms and $R_1$ is selected from a straight or branched chain alkyl group having from 1 to 20 carbon atoms, comprising the steps of:

(a) reacting a compound having the following formula:

wherein R and $R_1$ have been previously defined; with

(b) acetylene at a pressure of between 0 and 15 psig and at a temperature of between −80° C. and ca. 110° C.

(c) coordinating the reaction product of steps a) and b) with at least a molar equivalent of a Lewis base coordinating agent selected from ether, diether or polyether.

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**4,110,358**

## AMPHOLYTIC QUATERNARY AMMONIUM COMPOUNDS AND METHODS FOR THEIR PREPARATION

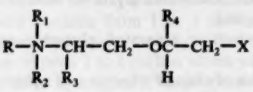
**John B. Braunwarth, Janesville, Wis., assignor to Armstrong Chemical Co., Inc., Janesville, Wis.**

**Filed May 24, 1976, Ser. No. 688,950**

**Int. Cl.[2] C09F *5/00***

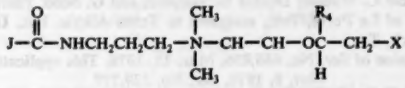
**U.S. Cl. 260—404.5** **21 Claims**

1. An ampholytic quaternary ammonium compound having the structure:



where R, $R_1$ and $R_2$ each is an alkyl group containing a carbon chain of from 1 to 22 carbon atoms, $R_3$ is H, $CH_3$ or $CH_3CH_2$, $R_4$ is H or $CH_3$, and X is COOH, CN, CHO, or $COOCH_3$.

**21**. An ampholytic quaternary ammonium compound having the structure:



where

$R_3$ is H, $CH_3$ or $CH_3CH_2$,

$R_4$ is H or $CH_3$,

X is COOH, CN, CHO or $COOCH_3$, and

J is an alkyl group having a chain of 1–22 carbon atoms and is derived from coconut oil.

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**4,110,359**

## PRODUCTION OF CLEANED AND PURIFIED SYNTHESIS GAS AND CARBON MONOXIDE

**Charles P. Marion, Mamaroneck, N.Y., assignor to Texaco Development Corporation, New York, N.Y.**

**Filed Dec. 10, 1976, Ser. No. 749,657**

**Int. Cl.**[2] **C07C** *27/06, 29/16, 51/10;* **C01B** *2/16*

**U.S. Cl. 260—449.5** **28 Claims**

**1**. Process for the simultaneous production of a product stream of cleaned and purified synthesis gas and a CO-rich product-gas stream comprising:

(1) reacting a hydrocarbonaceous or oxygenated hydrocarbonaceous organic material with a free-oxygen containing gas, optionally in the presence of a temperature moderator in the reaction zone of a free-flow noncatalytic partial-oxidation gas generator at a temperature in the range of about 1300° to 3000° F and at a pressure in the range of about 1 to 250 atmospheres to produce an effluent gas stream comprising $H_2$, CO, $H_2O$, solid particles of carbon and ash and at least one gas from the group consisting of $CO_2$, $H_2S$, COS, $Ch_4$, $NH_3$, $N_2$, and A;

(2) splitting the effluent gas stream from (1) into first and second gas streams, and simultaneously processing said first and second gas streams in separate first and second trains;

(3) cooling said first gas stream from (2) in said first train by indirect heat exchange in a separate heat-exchange zone; cleaning to remove any entrained solids, and removing water;

(4) purifying at least a portion of the gas stream from (3) in a first gas-purification zone and separating therefrom at least one gas from the group $CO_2$, $H_2S$, COS, $CH_4$, and $NH_3$, to produce a cleaned and purified stream of synthesis gas free-from gaseous sulfur compounds;

(5) dividing the cleaned and purified stream of synthesis gas from (4) into two streams and introducing the first of these streams into a CO-separation zone from which said product stream of CO-rich gas and a separte stream of $H_2$-rich gas are removed;

(6) cooling and cleaning said second gas stream from (2) by direct contact with water thereby removing the solid particles entrained therein and increasing the $H_2O$/CO mole ratio of said gas stream to a value in the range of about 2 to 5;

(7) reacting together CO and $H_2O$ in the gas streams from (6) in a water-gas shift conversion zone to produce a $H_2$-rich gas stream;

(8) removing $H_2O$ and purifying at least a portion of the $H_2$-rich gas stream from (7) in a second-gas purification zone and separating therefrom at lest one gas from the group $CO_2$, $H_2S$, COS, $CH_4$, and $NH_3$ to produce a cleaned and purified $H_2$-rich gas stream free from gaseous sulfur compounds; and

(9) mixing at least a portion of said second divided stream of cleaned and purified synthesis gas from (5) with from 0 to 100% of said $H_2$-rich gas stream from (5) and at least a portion of said cleaned and pruified $H_2$-rich gas stream from (8) to produce said product stream of cleaned and purified synthesis gas.

**18**. A process for producing substantially pure methanol and a by-product stream of CO-rich gas comprising:

(1) reacting a hydrocarbonaceous and oxygen-containing hydrocarbonaceous organic material with substantially pure oxygen optionally in the presence of $H_2O$ in a reaction zone of a free-flow noncatalytic partial oxidation gas generator at a temperature in the range of about 1300° to 3000° F and at a pressure in the range of about 1 to 250 atmospheres to produce an effluent gas stream comprising $H_2$, CO, $H_2O$, solid particles of carbon and ash and at least one gas from the group consisting of $CO_2$, $H_2S$, COS, $CH_4$, $NH_3$, $N_2$, and A; and wherein said effluent gas stream has a mole ratio $H_2$/CO in the range of about 0.5 to 1.9;

(2) splitting the efflucent gas stream from (1) into first and second gas streams, wherein said second split stream contains about 20 to 70 volume % of the effluent gas stream from (1), and the remainder of which comprising said first split stream, and simultaneously processing said first and second gas streams in separate first and second trains;

(3) cooling said first gas stream from (2) in said first train by indirect heat exchange in a separate heat-exchange zone, cleaning to remove any entrained solids, and removing water;

(4) purifying at least a portion of the gas stream from (3) in a first gas-purification zone and separating therefrom at least one gas from the group $CO_2$, $H_2S$, COS, $CH_4$, and $NH_3$, to produce a cleaned and purified stream of synthesis gas free-from gaseous sulfur-compounds and having a mole ratio $H_2$/CO in the range of about 0.5 to 1.9;

(5) dividing the cleaned and purified stream of synthesis gas from (4) into a first stream containing 5 to 50 volume percent and into a second stream containing the remainder of said cleaned and purified stream of synthesis gas, and introducing the first of these streams into a CO-separation zone from which said by-product stream of CO-rich gas and a separate stream of $H_2$-rich gas are removed;

(6) cooling and cleaning said second gas stream from (2) by direct contact with water thereby removing the solid particles entrained therein and increasing the $H_2O$/CO mole ratio of said gas stream to a value in the range of about 2 to 5;

(7) reacting together CO and $H_2O$ in the gas stream from (6) in a water-gas shift conversion zone to produce a $H_2$-rich gas stream;

(8) removing $H_2O$ and purifying at least a portion of the $H_2$-rich gas stream from (7) in a second-gas purification zone and separating therefrom at least one gas from the group $CO_2$, $H_2S$, COS, $CH_4$, and $NH_3$ to produce a cleaned and purified $H_2$-rich gas steam freefrom gaseous sulfur-compounds;

(9) mixing at least a portion of said second divided stream of cleaned and purified synthesis gas from (5) with from 0 to 100% of said $H_2$-rich gas stream from (5) and at least a portion of said cleaned and purified $H_2$-rich gas stream from (8) to produce a stream of cleaned and purified methanol synthesis gas having a mole ratio $H_2$/CO in the range of about 2–4;

(10) reacting at least a portion of said methanol synthesis gas in the presence of a methanol catalyst in a methanol-synthesis zone at a temperature in the range of about 400° to 750° F and at a pressure in the range of about 40 to 350 atm. to produce crude methanol, and purifying said crude methanol to oxygen-containing substantially pure methanol and by-product oxygen-contaning organic materials; and

(11) introducing at least a portion of said by-product oxygen-containing organic materials into the reaction zone of the partial oxidation gas generator in (1) as at least a portion of said oxygen-containing hydrocarbonaceous organic material.

24. A process for producing acetic acid comprising:

(1) reacting hydrocarbonaceous and oxygen-containing hydrocarbonaceous organic material with substantially pure oxygen optionally in the presence of $H_2O$ in a reaction zone of a free-flow noncatalytic partial-oxidation gas generator at a temperature in the range of about 1300° to 3000° F and at a pressure in the range of about 1 to 250 atmospheres to produce an effluent gas stream comprising $H_2$, CO, $H_2O$, solid particles of carbon and ash and at least one gas from the group consisting of $CO_2$, $H_2S$, COS, $CH_4$, $NH_3$, $N_2$, and A; and wherein said effluent gas stream has a mole ratio $H_2/CO$ in the range of about 0.5 to 1.9;

(2) splitting the effluent gas stream from (1) into first and second gas streams, wherein said second split stream contains about 20 to 70 volume % of the effluent gas stream from (1), and the remainder of which comprising said first split stream, and simultaneously processing said first and second gas streams in separate first and second trains;

(3) cooling said first gas stream from (2) in said first train by indirect heat exchange in a separate heat-exchange zone, cleaning to remove any entrained solids, and removing water;

(4) purifying at least a portion of the gas stream from (3) in a first gas-purification zone and separating therefrom at least one gas from the group $CO_2$, $H_2S$, COS, $CH_4$, and $NH_3$, to produce a cleaned and purified stream of synthesis gas free-from gaseous sulfur-compounds and having a mole ratio $H_2/CO$ in the range of about 0.5 to 1.9;

(5) dividing the cleaned and purified stream of synthesis gas from (4) into a first stream containing 5 to 50 volume percent and into a second stream containing the remainder of said cleaned and purified stream of synthesis gas, and introducing the first of these stream into a CO-separation zone from which a stream of substantially pure CO gas and a separate stream of $H_2$-rich gas are removed;

(6) cooling and cleaning said second gas stream from (2) by direct contact with water thereby removing the solid particles entrained therein and increasing the $H_2O/CO$ mole ratio of said gas stream to a value in the range of about 2 to 5;

(7) reacting together CO and $H_2O$ in the gas stream from (6) in a water-gas shift conversion zone to produce a $H_2$-rich gas stream;

(8) removing $H_2O$ and purifying at least a portion of the $H_2$-rich gas stream from (7) in a second-gas purification zone and separating therefrom at least one gas from the group $CO_2$, $H_2S$, COS, $CH_4$, and $NH_3$ to produce a cleaned and purified $H_2$-rich gas stream free-form gaseous sulfur-compunds;

(9) mixing at least a portion of said second divided stream of cleaned and purified synthesis gas from (5) with from 0 to 100% of said $H_2$-rich gas stream from (5) and at least a portion of said cleaned and purified $H_2$-rich gas stream from (8) to produce a stream of cleaned and purified methanol synthesis gas having a mole ratio $H_2/CO$ in the range of about 2–4;

(10) reacting at least a portion of said methanol synthesis gas in the presence of a methanol catalyst in a methanol-synthesis zone at a temperature in the range of about 400° to 750° F and at a pressure in the range of about 40 to 350 atm. to produce crude methanol, and purifying said crude methanol to produce substantially pure methanol and by-product oxygen-containing organic materials;

(11) reacting at least a portion of said substantially pure methanol with at least a portion of said substantially pure carbon monoxide in the presence of a carbonylation catalyst in an acetic acid-synthesis zone at a temperature in the range of about 302° to 608° F and at a pressure in the range of about 1 to 700 atmospheres to produce impure acetic acid, and purifying said impure acetic acid to produce substantially pure acetic acid and by-product oxygen-containing organic materials; and

(12) introducing at least a portion of said by-product oxygen-containing organic materials from (10), or (11), or both into the reaction zone of the partial oxidation gas generator in (1) as at least a portion of said oxygen-containing hydrocarbonaceous organic material.

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## 4,110,360
## PREPARATION OF ESTERS

**Roger A. Sheldon; Peter Been, both of Amsterdam, Netherlands; Derek A. Wood, Sittingbourne, and Ronald F. Mason, Ashford, both of England, assignors to Shell Oil Company, Houston, Tex.**

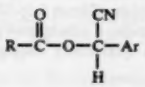
**Filed Feb. 3, 1977, Ser. No. 765,184**

**Claims priority, application United Kingdom, Mar. 1, 1976, 8044/76**

**Int. Cl.² C07C *120/00, 121/66***

**U.S. Cl. 260—465 D** **14 Claims**

1. A process for the preparation of an ester of the formula I



(I)

wherein Ar represents a phenoxy substituted phenyl group and R represents a branched-chain alkyl group substituted by a halophenyl group, which process comprises contacting an aromatic aldehyde of the formula ArC(O)H and an acyl halide of the formula RC(O)Hal, in which formulas Ar and R have the same meaning as in the formula I and Hal represents a halogen atom, in the presence of a substantially water-immiscible aprotic solvent comprising an alkane or cycloalkane containing 6 to 10 carbon atoms or a mixture thereof, with water and solid water-soluble cyanide in which the molar ratio of the amount of water to the total amount of water-soluble cyanide is in the range of 0.05 to 1 and recovering the desired ester product from the reaction mixture.

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## 4,110,361
## PREPARATION OF ESTERS

**Roger A. Sheldon, and Peter Been, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.**

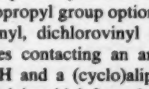
**Filed Feb. 3, 1977, Ser. No. 765,185**

**Claims priority, application United Kingdom, Mar. 1, 1976, 8045/76; Mar. 1, 1976, 8046/76**

**Int. Cl.² C07C *120/00, 121/66***

**U.S. Cl. 260—465 D** **30 Claims**

1. A process for the preparation of an ester of formula I



(I)

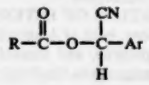
wherein Ar represents a phenoxy substituted phenyl group and R an alkyl group optionally substituted by halophenyl or alkylphenyl or a cyclopropyl group optionally substituted by alkyl, halogen, isobutenyl, dichlorovinyl or dibromovinyl, which process comprises contacting an aromatic aldehyde of the formula ArC(O)H and a (cyclo)aliphatic acyl halide of the formula RC(O)Hal, in which formulas Ar and R have the same meaning as in the formula I and Hal represents a halogen atom, with water, a water-soluble cyanide, a substantially water-immiscible aprotic solvent and a poly(alkyleneoxy)-derivative containing from 1 to 50 alkyleneoxy units formed by reacting an alkanol containing 8 to 20 carbon atoms with ethylene oxide or propylene oxide as catalyst and recovering the desired ester product from the reaction mixture.

## 4,110,362
## PREPARATION OF ESTERS

Roger A. Sheldon, and Peter Been, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

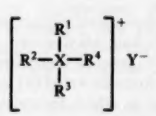
Filed Feb. 3, 1977, Ser. No. 765,186
Claims priority, application United Kingdom, Mar. 1, 1976, 8045/76; Mar. 1, 1976, 8046/76
Int. Cl.[2] C07C *120/00, 121/66*
U.S. Cl. 260—465 D 31 Claims

1. A process for the preparation of an ester of formula I



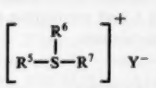
(I)

wherein Ar represents a phenoxy substituted phenyl group and R is an alkyl group optionally substituted by halophenyl or alkylphenyl or a cyclopropyl group optionally substituted by alkyl, halogen, isobutenyl, dichlorovinyl or dibromovinyl, which process comprises contacting an aromatic aldehyde of the formula ArC(O)H and a (cyclo)aliphatic acyl halide of the general formula RC(O)Hal, in which formulas Ar and R have the same meaning as in formula I and Hal represents a halogen atom having an atomic number of from 9 to 53, inclusive, with water, a water-soluble cyanide, a substantially water-immiscible aprotic solvent and a quaternary onium phase transfer catalyst of the formula II



(II)

wherein X represents a nitrogen, phosphorus or arsenic atom, $R^1$, $R^2$, $R^3$ and $R^4$ each an alkyl, aralkyl, alkaryl or aryl group and Y a monovalent ion, or a sulfonium compound of the formula III



(III)

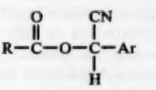
wherein $R^5$ $R^6$ and $R^7$ each represents an alkyl group and Y a monovalent ion and recovering the desired ester product from the reaction mixture.

## 4,110,363
## PREPARATION OF ESTERS

Roger A. Sheldon, and Peter Been, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Feb. 3, 1977, Ser. No. 765,187
Claims priority, application United Kingdom, Mar. 1, 1976, 8045/76; Mar. 1, 1976, 8046/76
Int. Cl.[2] C07C *120/00, 121/66*
U.S. Cl. 260—465 D 29 Claims

1. A process for the preparation of an ester of the formula



(I)

wherein Ar represents a phenoxy substituted phenyl group and R an alkyl group optionally substituted by halophenyl or alkylphenyl or a cyclopropyl group optionally substituted by alkyl, halogen, isobutenyl, dichlorovinyl or dibromovinyl, which process comprises contacting an aromatic aldehyde of the formula ArC(O)H and a (cyclo)aliphatic aryl halide of the formula RC(O)Hal, in which formulas Ar and R have the same meaning as in the formula I and Hal represents a halogen atom having an atomic number from 9 to 53, inclusive, with water, a water-soluble cyanide, a substantially water-immiscible aprotic solvent and a macrocyclic polyether phase transfer catalyst containing a total of from 4 to 80 atoms and 14 to 28 ring atoms at least 4 of which are oxygen atoms and recovering the desired ester from the reaction mixture.

## 4,110,364
## CURABLE RESIN COMPOSITIONS OF CYANATE ESTERS

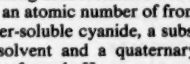
Morio Gaku; Kazuhiro Suzuki, and Kazuyuki Nakamichi, all of Tokyo, Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Japan

Filed Mar. 18, 1975, Ser. No. 559,650
Claims priority, application Japan, Mar. 19, 1974, 49-30636; Apr. 8, 1974, 49-38915
Int. Cl.[2] C08G *73/00, 73/112*
U.S. Cl. 528—170 11 Claims

1. A curable resin composition comprising:

(a) a cyanate ester component selected from the group consisting of:

(i) polyfunctional aromatic cyanate ester monomers having the formula:



wherein $n$ is at least 2 and not more than 5 and R is an aromatic organic group, the cyanate groups being bonded to an aromatic ring of said aromatic organic group,

(ii) homoprepolymers of (i) and

(iii) coprepolymers of (i) and an amine, said amine being a diamine of the formula $H_2N - R^2 - NH_2$, wherein $R^2$ is a divalent aromatic or alicyclic organic group, or a member selected from the group consisting of hexamethylenetetramine, polyethyleneimine, polyamino styrene, polyvinyl imidazole, triethylene diamine, 2-methylimidazole, 2-undecyclimidazole, 2-heptadecylimidazole, 2-phenylimidazole, 2-ethyl-4-methylimidazole, 1-benzyl-2-methylimidazole, 1-propyl-2-methylimidazole, 1-cyanoethyl-2-methylimidazole, 1-cyanoethyl-2-ethyl-4-methylimidazole, 1-cyanoethyl-2-undecylimidazole, 1-cyanoethyl-2-phenylimidazole, 1-guanaminoethyl-2-methylimidazole, and adducts formed between these imidazoles and trimellitic acid and

(b) a bismaleimide component selected from the group consisting of (i) bismaleimides, (ii) bismaleimide homoprepolymers and (iii) bismaleimide coprepolymers of (i) and amines as above-defined,

the weight ratio of component (a) to (b) being 1:99 to 99:1.

## 4,110,365
## PROCESS FOR THE MANUFACTURE OF NAPHTHALENE-MONOSULFONIC ACIDS

Siegfried Bildstein; Rudolf Lademann; Siegfried Pietzsch, all of Kelkheim, Taunus, and Georg Schaeffer, Hofheim, Taunus, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 417,755, Nov. 21, 1973, abandoned.
This application Jun. 26, 1975, Ser. No. 590,498
Claims priority, application Fed. Rep. of Germany, Nov. 24, 1972, 2257676; Jan. 20, 1973, 2302869
Int. Cl.[2] C07C *143/24*
U.S. Cl. 260—505 C 8 Claims

1. A process for the manufacture of naphthalene-monosulfonic acids by reacting naphthalene and sulfuric acid at elevated temperature, which comprises: intensely mixing a portion of the said reaction components at a temperature in the range of from 140° to 185° C. until a homogeneous phase has formed; and thereafter introducing further portions of said reaction components into said homogeneous phase and com-

pleting the reaction of said components in said homogeneous phase.

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4,110,366

## PROCESS FOR PRODUCING ALKALI METAL STYRENESULFONATE

Hanzo Tamabayashi; Tatsuo Hattori; Tetsuo Tanaka; Yasuhiro Oda, and Keiichi Kihara, all of Shin-nanyo, Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Japan

Filed Dec. 1, 1976, Ser. No. 746,531
Claims priority, application Japan, Dec. 17, 1975, 50-149539
Int. Cl.[2] C07C *143/24*
U.S. Cl. 260—505 N 5 Claims

1. A process for producing an alkali metal styrenesulfonate, which comprises:

preferentially extracting styrenesulfonate acid anions from an aqueous solution containing an alkali metal halide and an alkali metal styrenesulfonate in a concentration of 2 wt% to the limit of solubility of the styrenesulfonate with an organic solvent containing a protonic acid salt of an inorganic acid and an amine having more than 7 carbon atoms, which is an ion-exchange liquid and which contains an alkyl, alkenyl, aryl or aralkyl group, wherein the salt is present in an amount of 5–40% to total mixture, as an extracting reagent; and

then back extracting styrenesulfonic acid anions with an aqueous solution of an alkali metal hydroxide.

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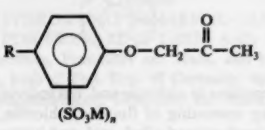
4,110,367

## SULFONATED ALKYLPHENOXY ACETONES

John George Papalos, Ledgewood, N.J., assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Feb. 2, 1976, Ser. No. 654,068
Int. Cl.[2] C07C *143/24;* D06P *5/04*
U.S. Cl. 260—511 5 Claims

1. A compound having the formula



wherein:

R is an alkyl group having 8-20 carbon atoms;

M is hydrogen, sodium, potassium, ammonium, ethyl ammonium, dimethyl ammonium, or diethanol ammonium; and

*n* is a number of from 1 to 2 inclusive.

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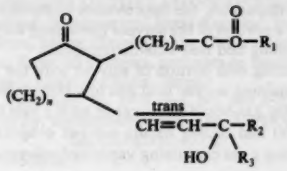
4,110,368

## HYDRO SUBSTITUTED PROSTANOIC ACIDS AND ESTERS

Middleton Brawner Floyd, Jr., Suffern, N.Y.; Martin Joseph Weiss, Oradell, N.J.; John Frank Poletto, Nanuet, N.Y.; Robert Eugene Schaub, Upper Saddle River, and Karel Francis Bernady, Belle Mead, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 540,052, Jan. 10, 1975, abandoned, which is a division of Ser. No. 355,349, Apr. 27, 1973, Pat. No. 3,875,607, which is a division of Ser. No. 274,768, Jul. 24, 1972, abandoned. This application Jun. 15, 1977, Ser. No. 806,871
Int. Cl.[2] C07C *177/00*
U.S. Cl. 260—514 D 8 Claims

1. A racemic mixture of the formula:



wherein *n* is the integer 1 or 2, *m* is the integer 5 or 6, $R_1$ is hydrogen or alkyl having up to 3 carbon atoms, $R_2$ is 2-cis-pentenyl or 1,1-dimethyl-n-pentyl, and $R_3$ is hydrogen or methyl with the proviso that when $R_2$ is 1,1-dimethyl-n-pentyl then $R_3$ must be hydrogen; and the pharmaceutically acceptable cationic salts thereof when $R_1$ is hydrogen.

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4,110,369

## PROCESS FOR THE PREPARATION OF UNSATURATED ACIDS FROM UNSATURATED ALDEHYDES

James F. White, Akron, and Wilfrid G. Shaw, Lyndhurst, both of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Oct. 19, 1976, Ser. No. 733,736
Int. Cl.[2] C07C *51/32*
U.S. Cl. 260—530 N 13 Claims

1. In the process for the preparation of acrylic acid or methacrylic acid by the oxidation of acrolein or methacrolein in the vapor phase with molecular oxygen in the presence of an oxide or oxide complex active catalyst of the formula

$$Mo_{12}P_bAs_cCu_dO_f$$

wherein

*b*, *c* and *d* are numbers from 0.001 to 10;

*f* is the number of oxygens required by the valence states of the other elements present,

at an elevated temperature of about 200° to about 500° C., the improvement comprising:

using a coated catalyst consisting essentially of an inert support material having a diameter of at least 20 microns and an outer surface and a continuous coating of said active catalyst on said inert support strongly adhering to the outer surface of said support wherein said coated catalyst is prepared by partially wetting the support with water and rolling the partially wet support in a powder of the active catalyst.

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4,110,370

## METHOD OF SEPARATING HIGH-BOILING OR NON-VOLATILE MATERIALS

Heinz Engelbach, Limburgerhof; Richard Krabetz, Kirchheim; Gerd Duembgen, Dannstadt-Schauernheim; Carl-Heinz Willersinn, Ludwigshafen; Walter Frey, Ludwigshafen; Ulrich Lebert, Ludwigshafen, and Fritz Thiessen, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

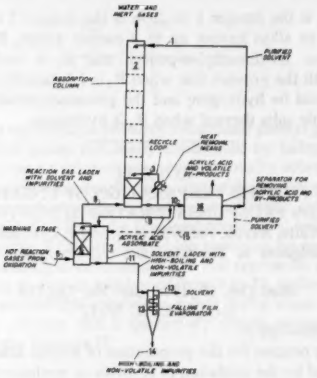
Filed Oct. 7, 1975, Ser. No. 620,252
Claims priority, application Fed. Rep. of Germany, Oct. 19, 1974, 2449780
Int. Cl.[2] C07C *57/04;* B01D *1/14*
U.S. Cl. 260—530 N 5 Claims

1. In a process for separating acrylic acid from the hot reaction gas obtained from the manufacture of acrylic acid by catalytic oxidation of propylene and/or acrolein with molecular oxygen, said hot reaction gas containing acrylic acid and low-boiling impurities, wherein the acrylic acid and low-boiling impurities are absorbed with a solvent in a means for absorbing gases into solvents and high-boiling and non-volatile impurities are formed in said means, the solvent boiling in the range from about 200° to 360° C., and the solvent is re-used for

absorption after being separated from the acrylic acid and low-boiling impurities, the improvment comprising:

(a) taking a portion of the solvent containing acrylic acid and high-boiling and non-volatile impurities,

(b) contacting said portion of solvent with the hot reaction gas containing acrylic acid and low-boiling impurities in a means for gas-liquid exchange at such a rate that between about 90 and 99.9% of the solvent evaporates thereby producing a gas containing vaporized solvent, acrylic acid




and low-boiling impurities and a residual solvent, the residual solvent containing the high-boiling and non-volatile impurities,

(c) conducting the gas containing vaporized solvent, acrylic acid and low-boiling impurities to said means for absorbing gases into solvents with a means for conducting gas, and

(d) separating the residual solvent from said means for gas-liquid exchange.

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**4,110,371**

## PREPARATION OF OXYDICARBOXYLIC ACID SALTS

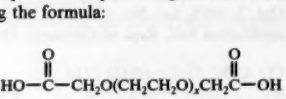
**Heinz Schulze, and Edward T. Marquis, both of Austin, Tex., assignors to Texaco Development Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 632,034, Nov. 4, 1975, abandoned. This application Jun. 16, 1977, Ser. No. 806,981**

**Int. Cl.² C07C *59/12***

**U.S. Cl. 260—531 C** **9 Claims**

1. A process for producing metal salts of dicarboxylic acids having the formula:



$$HO-\overset{O}{\overset{\|}{C}}-CH_2O(CH_2CH_2O)_xCH_2\overset{O}{\overset{\|}{C}}-OH$$

wherein *x* is from 0 to about 4, directly from the corresponding oxyethylene diol comprising the step of:

heating said oxyethylene diol with an alkali metal hydroxide in the presence of a catalytically effective amount of a nickel-copper-chromia catalyst at temperatures in the range of from about 200° C. to about 300° C. and at pressures sufficient to maintain the reactants and products substantially in liquid phase.

**4,110,372**

## PROCESS FOR THE PURIFICATION OF CARBOXYLIC ACIDS

**Hansjorg Hey, Hofheim, Taunus; Helmut Schaum, Bad Soden am Taunus, and Hans-Jurgen Arpe, Fischbach, Taunus, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 419,291, Nov. 27, 1973, abandoned. This application Aug. 12, 1975, Ser. No. 603,940**

**Claims priority, application Fed. Rep. of Germany, Nov. 29, 1972, 2258441**

**Int. Cl.² C07C *51/42***

**U.S. Cl. 260—540** **11 Claims**

1. In a process for removing formic acid from a crude mixture thereof with a carboxylic acid selected from the group consisting of lower fatty acids other than formic acid by reacting the formic acid component of the mixture with a carboxylic anhydride, a compound forming an anhydride with a carboxylic acid, or a mixture thereof, the improvement which comprises carrying out the reaction at a temperature of from about 20° C. to 300° C. in the presence of an acid catalyst which is a mineral acid, a sulfonic acid, an acidic salt of a mineral acid or a heterogeneous acid catalyst selected from the group consisting of acidic ion exchange resins in the $H^+$ form and acid-activated bentonites and zeolites.

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**4,110,373**

## PROCESS FOR THE PREPARATION OF BENZOYL HALIDE AND HALOSULFONYLBENZOYL HALIDE

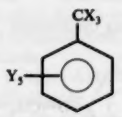
**F. Howard Day, Grand Island, N.Y., assignor to Hooker Chemicals & Plastics Corp., Niagara Falls, N.Y.**

**Filed Oct. 3, 1977, Ser. No. 839,045**

**Int. Cl.² C07C *51/58, 63/10, 143/38, 143/40***

**U.S. Cl. 260—543 R** **11 Claims**

1. A process for the co-production of benzoyl halide and meta-halosulfonylbenzoyl halide by the reaction of benzotrihalide with oleum which comprises gradually adding to oleum, a benzotrihalide of the formula:




wherein X is bromine or chlorine and Y is individually selected from the group consisting of fluorine, chlorine, bromine, iodine, alkyl, halosubstituted alkyl, aryl, and hydrogen, with the proviso that at least one Y substitutent at a meta-position is hydrogen.

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**4,110,374**

## PROCESS FOR SEPARATING AND RECOVERING UNREACTED MATERIALS IN UREA SYNTHESIS

**Shigeru Inoue, Kamakura, Japan, assignor to Mitsui Toatsu Chemicals Inc., Tokyo, Japan**

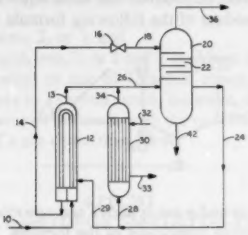
**Continuation-in-part of Ser. No. 736,551, Oct. 28, 1976, abandoned. This application Apr. 18, 1977, Ser. No. 788,689**

**Int. Cl.² C07C *126/02***

**U.S. Cl. 260—555 A** **17 Claims**

1. In a process for recovering unreacted materials and heat from a urea synthesis effluent including-the steps of reacting in a urea synthesis zone carbon dioxide with ammonia under urea synthesis temperature and pressure conditions to obtain said urea synthesis effluent containing urea, an excess of ammonia, unreacted ammonium carbamate and water, subjecting said urea synthesis effluent to at least two ammonium carbamate decomposition stages including at least one high pressure steps at a gauge pressure above 10 kg/cm² and a low pressure stage at a gauge pressure below 5 kg/cm² to separate from said urea synthesis effluent gaseous mixtures each composed of ammonia, carbon dioxide and water vapor in the respective separa-

tion zones of said high pressure and low pressure decomposition stages, at least a portion of the separation zone of the low pressure stage being a rectification zone having a top zone and a bottom zone, contacting each of said gaseous mixtures with an absorbent in absorption zones each of which has substantially the same pressure as that of each of the corresponding separation zones to absorb said gaseous mixtures in said absorbent successively, and recycling the thus-obtained absorbate to the urea synthesis zone, the improvement which comprises cooling the urea synthesis effluent from the separation zone of said high pressure stage to a temperature of 105° - 170° C. by



indirect heat exchange in a heat exchange zone with the urea synthesis effluent present in said bottom zone of the rectification zone of said low pressure stage, reducing the pressure of said cooled urea synthesis effluent to that of the low pressure stage, introducing the thus pressure reduced effluent into the top zone of the rectification zone and at the same time heating said urea synthesis effluent present in the bottom zone of said rectification zone by said indirect heat exchange in said heat exchange zone and in an additional heating zone to maintain the temperature of the top zone of the rectification zone at 60° - 120° C. and the temperature of the bottom zone of the rectification zone at 100° - 140° C.

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**4,110,375**

## NOVEL 2-HYDROXYNAPHTHALENE-1-ALDEHYDES, PROCESS FOR PREPARING THEM AND THEIR USE

**Theodor Papenfuhs, Frankfurt am Main, and Heinrich Volk, Bad Vilbel, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

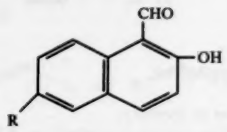
**Division of Ser. No. 707,751, Jul. 22, 1976, Pat. No. 4,064,349. This application Sep. 21, 1977, Ser. No. 835,299**

**Claims priority, application Fed. Rep. of Germany, Jul. 30, 1975, 2533960**

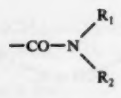
**Int. Cl.² C07C *103/22***

**U.S. Cl. 260—559 R** **3 Claims**

1. A compound of the formula



in which R is the group



wherein $R_1$ is hydrogen or alkyl of 1 to 4 carbon atoms, and $R_2$ is hydrogen, alkyl of 1 to 4 carbon atoms or phenyl.

**4,110,376**

## CYCLOPROPYLMETHYLAMINE DERIVATIVES

**Atsuyuki Kojima, Nishinomiya; Junki Katsube, Toyonaka; Yoshito Kameno, Mino; Shigeho Inaba, Takarazuka, and Hisao Yamamoto, Kobe, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

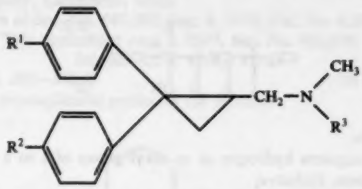
**Filed Aug. 15, 1975, Ser. No. 605,012**

**Claims priority, application Japan, Aug. 15, 1974, 49-93881**

**Int. Cl.² C07C *87/32***

**U.S. Cl. 260—570 R** **5 Claims**

1. A compound of the formula:



wherein $R^1$ and $R^2$ are hydrogen or halogen and $R^3$ is hydrogen or methyl, or a non-toxic salt thereof.

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**4,110,377**

## PROCESS FOR THE ALKYLATION OF SECONDARY ALIPHATIC AMINES IN THE PRESENCE OF AN AMIDE OF A TRANSITION METAL

**Mario Gabriele Clerici, San Donato Milanese (Milan); Federico Maspero, Milan, and Alfonso D'Alfonso, San Donato Milanese (Milan), all of Italy, assignors to ANIC S.p.A., Italy**

**Filed Sep. 7, 1977, Ser. No. 831,241**

**Claims priority, application Italy, Oct. 28, 1976, 28778 A/76**

**Int. Cl.² C07C *85/22, 85/24***

**U.S. Cl. 260—583 R** **4 Claims**

1. A process for the alkylation of secondary aliphatic amines consisting of reacting a secondary aliphatic amine containing at least one hydrogen on an alpha carbon atom with an olefine in the presence of an amide of a transition metal.

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**4,110,378**

## METHOD OF REDUCTION EMPLOYING RESIN ADSORBENTS

**Wolfgang G. Geyer, Glassboro, N.J., assignor to Rohm and Haas Company, Philadelphia, Pa.**

**Division of Ser. No. 583,821, Jun. 4, 1975, Pat. No. 3,975,155. This application Jun. 1, 1976, Ser. No. 691,273**

**Int. Cl.² C07B *1/00*; C07C *103/22***

**U.S. Cl. 260—558 S** **1 Claim**

1. A method for the reduction of a reducible functional group selected from —S—N—, —S—S—, >C=O, >C=NHNH—, —CHO,

and $—N_3$ which comprises adsorbing the organic compound containing said reducible functional group on a polymeric macroreticular resin adsorbent and reducing the adsorbed functional group with an aqueous solution of sodium borohydride.

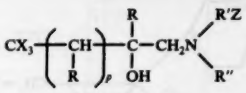
**4,110,379**

## NOVEL HALOGENATED ORGANIC COMPOUNDS, PROCESS FOR THE PRODUCTION OF SAME, AND POLYURETHANES CONTAINING SAME

**David Aelony, Beer-Sheva, and David Vofsi, Rehovot, both of Israel, assignors to Makhteshim Chemical Works Ltd., Beer Sheva, Israel**

**Filed Mar. 11, 1977, Ser. No. 776,899**
**Claims priority, application Israel, Mar. 12, 1976, 49209**
**Int. Cl.[2] C07C *91/06, 91/08, 93/04***
**U.S. Cl. 260—584 R** **15 Claims**

1. Compounds of the formula



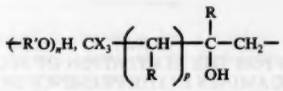
wherein:

R designates hydrogen or an alkyl group of 1 to 6 carbon atoms, inclusive;

R′ designates an alkylene group of 2 to 10 carbon atoms, inclusive, or alkylene substituted by a methyl or by a halomethyl group;

R″ designates hydrogen, an alkyl group of 1 to 4 carbon atoms, inclusive,

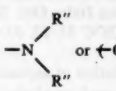
—R′Z,



or $C(CH_2OH)_3$;

X designates chlorine or bromine;

Z designates —OH,



*n* is an integer from 1 to 5 (R′ not necessarily being identical); and

*p* is an integer from 0 to 4.

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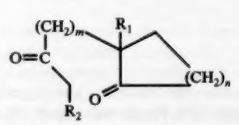
**4,110,380**

## ASYMMETRIC SYNTHESIS OF ORGANIC COMPOUNDS

**Zoltan George Hajos, Upper Montclair, and David Richard Parrish, Glen Ridge, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Division of Ser. No. 467,356, May 6, 1974, abandoned, which is a division of Ser. No. 96,597, Dec. 9, 1970, Pat. No. 3,975,440, which is a continuation-in-part of Ser. No. 4,762, Jan. 21, 1970, abandoned. This application Sep. 14, 1976, Ser. No. 723,129**
**The portion of the term of this patent subsequent to Aug. 8, 1995, has been disclaimed.**
**Int. Cl.[2] C07C *45/00***
**U.S. Cl. 260—586 C** **3 Claims**

1. A process wherein two mole equivalents of a racemic mixture of a compound of the formula

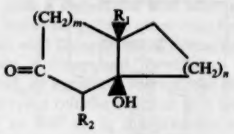


IX

where $R_1$ is lower alkyl, aryl, aralkyl, lower alkenyl or lower alkynyl; $R_2$ is hydrogen, lower alkyl, aryl, aralkyl and $(-CH_2)_pR_3$ where p is an integer between 0 and 2 inclusive and $R_3$ is

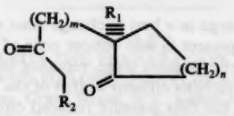
where $R_4$ is hydrogen or lower alkyl and $R_5$ is lower alkylenedioxy or arylenedioxy; *n* is an integer between 1 and 5 inclusive and *m* is an integer between 1 and 4 inclusive

is cyclized in the presence of an optically active l-amino acid in an aprotic solvent to produce one mole equivalent of an optically active product of the following formula



X

where $R_1$, $R_2$, *m* and *n* are as above and one mole equivalent of an optically active compound of the formula



I-a

where $R_1$, $R_2$, *m* and *n* are as above.

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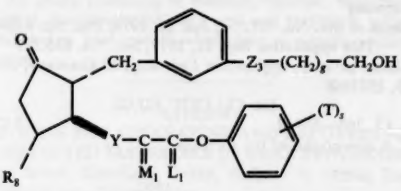
**4,110,381**

## 2-DECARBOXY-2-HYDROXY-METHYL-3,7-INTER-M-PHENYLENE-ω-PHENOXY-PGF$_1$ COMPOUNDS

**Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Division of Ser. No. 647,357, Jan. 8, 1976, Pat. No. 4,055,602. This application Aug. 5, 1977, Ser. No. 822,026**
**Int. Cl.[2] C07C *49/82, 49/84***
**U.S. Cl. 260—590 C** **29 Claims**

1. A prostaglandin analog of the formula



wherein

$Z_3$ is oxa or methylene;

wherein

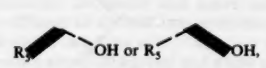
$R_8$ is hydrogen or hydroxy;

wherein

Y is a trans-CH=CH—;

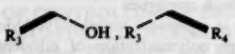
wherein

$M_1$ is

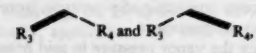


wherein $R_5$ is hydrogen or methyl;

wherein $L_1$ is



or a mixture of



wherein $R_3$ and $R_4$ are hydrogen or methyl, being the same or different;

wherein *g* is one, 2, or 3; and

wherein *s* is zero, one, 2, or 3 and T is chloro, fluoro, trifluoromethyl, alkyl of one to 3 carbon atoms, inclusive, or alkoxy of one to 3 carbon atoms, inclusive, the various T's being the same or different, with the proviso that not more than two T's are other than alkyl.

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**4,110,382**

**2-DECARBOXY-2-HYDROXY-METHYL-ω-PHENYL-PGE ANALOGS**

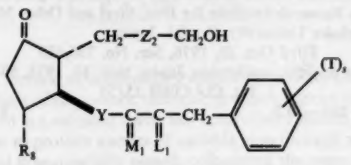
**Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Division of Ser. No. 647,357, Jan. 8, 1976, Pat. No. 4,055,602. This application Aug. 5, 1977, Ser. No. 822,035**

**Int. Cl.[2] C07C *49/82***

**U.S. Cl. 260—590 C** **119 Claims**

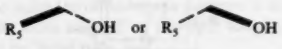
1. A prostaglandin analog of the formula



wherein $R_8$ is hydrogen or hydroxy;

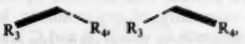
wherein Y is trans-CH=CH—;

wherein $M_1$ is

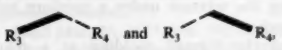


wherein $R_5$ is hydrogen or methyl;

wherein $L_1$ is



or a mixture of



wherein $R_3$ and $R_4$ are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of $R_3$ and $R_4$ is methyl only when the other is hydrogen or methyl;

wherein $Z_2$ is

cis-CH=CH—$CH_2$—$(CH_2)_g$—$CF_2$—;

cis-$CH_2$—CH=CH—$(CH_2)_g$—$CH_2$—; or

—$(CH_2)_3$—$(CH_2)_g$—$CF_2$—;

wherein *g* is one, 2, or 3; and

wherein *s* is zero, one, 2, or 3 and T is chloro, fluoro, trifluoromethyl, alkyl of one to 3 carbon atoms, inclusive, or alkoxy of one to 3 carbon atoms, inclusive, the various T's being the same or different, with the proviso that not more than two T's are other than alkyl.

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**4,110,383**

**2-DECARBOXY-2-HYDROXYMETHYL-3-7-INTER-M-PHENYLENE-ω-PHENYL-PGA$_1$ OR 9-DEOXY-9,10-DIDEHYDRO-PGD$_1$ COMPOUNDS**

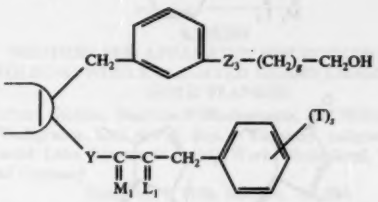
**Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Division of Ser. No. 647,357, Jan. 8, 1976, Pat. No. 4,055,602. This application Aug. 5, 1977, Ser. No. 822,038**

**Int. Cl.[2] C07C *49/82, 49/84***

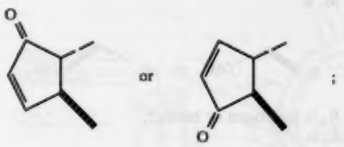
**U.S. Cl. 260—590 C** **39 Claims**

1. A prostaglandin analog of the formula



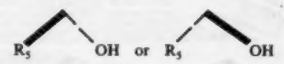
wherein $Z_3$ is oxa or methylene;

wherein D is



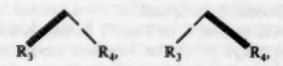
wherein Y is trans—CH=CH—;

wherein $M_1$ is

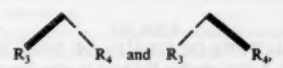


wherein $R_3$ is hydrogen or methyl;

wherein $L_1$ is



or a mixture of



wherein $R_3$ and $R_4$ are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of $R_3$ and $R_4$ is methyl only when the other is hydrogen or methyl;

wherein *g* is one, 2, or 3; and

wherein *s* is zero, one, 2, or 3 and T is chloro, fluoro, trifluoromethyl, alkyl of one to 3 carbon atoms, inclusive, or alkoxy of one to 3 carbon atoms, inclusive, the various T's being the same or different, with the proviso that not more than two T's are other than alkyl.

**4,110,384**

## 2-DECARBOXY-2-HYDROXYMETHYL-5-OXA-ωPHENOXY-PGA$_1$ OR 9-DEOXY-9,10-DIDEHYDRO-PGD$_1$COMPOUNDS

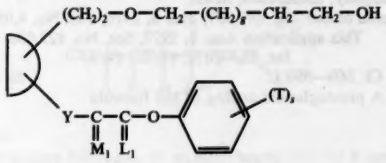
**Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Division of Ser. No. 647,357, Jan. 8, 1976, Pat. No. 4,055,602. This application Aug. 5, 1977, Ser. No. 822,301**

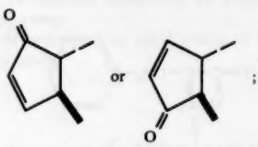
**Int. Cl.$^2$ C07C *49/84***

**U.S. Cl. 260—590 C** **29 Claims**

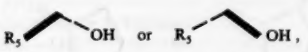
1. A prostaglandin analog of the formula



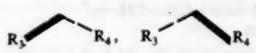
wherein D is



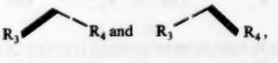
wherein Y is trans—CH=CH—;
wherein $M_1$ is



wherein $R_5$ is hydrogen or methyl;
wherein $L_1$ is



or a mixture of



wherein $R_3$ and $R_4$ are hydrogen or methyl, being the same or different;

wherein *g* is one, 2, or 3; and

wherein *s* is zero, one, 2, or 3 and T is chloro, fluoro, trifluoromethyl, alkyl of one to 3 carbon atoms, inclusive, or alkoxy of one to 3 carbon atoms, inclusive, the various T's being the same or different, with the proviso that not more than two T's are other than alkyl.

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**4,110,385**

## MANUFACTURE OF FIBRIDS OF POLYOLEFINS

**Bruno Sander, Ludwigshafen; Eckhard Bonitz, Frankenthal, and Kurt Scherling, Hemsbach, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen am Rhein, Fed. Rep. of Germany**

**Continuation of Ser. No. 532,193, Dec. 12, 1974, abandoned. This application Aug. 16, 1976, Ser. No. 714,404**

**Claims priority, application Fed. Rep. of Germany, Dec. 21, 1973, 2363672**

**Int. Cl.$^2$ D21F *11/00***

**U.S. Cl. 264—13** **4 Claims**

1. A process for the manufacture of discrete fibrids of polyethylene having lengths of 1 to 50 mm and thicknesses between 2 and 30 μm which comprises

(a) dissolving in a pressure vessel polyethylene, obtained by low-pressure polymerization of ethylene, in a solvent which is a mixture of pentanes and a naphtha cut boiling at 25° to 140° C. and containing pentanes in an amount of from 5 to 50% by weight, said pentanes being selected from the group consisting of n-pentane, isopentane, cyclopentane and neopentane,

(b) maintaining the vapor pressure in said pressure vessel at 4 to 60 atmospheres and maintaining the temperature of the polyolefin solution in said pressure vessel at temperature of 80° 250° C and above the boiling point of said solvent at standard pressure,

(c) passing said polyethylene solution from said pressure vessel through an orifice into a space maintained at lower temperature and pressure than those in said pressure vessel,

(d) flashing off said solvent in said space from the solution passed through said orifice to produce a tangled mass of said fibrids, said amount of said pentanes in said solvent further being sufficient to cause the polyethylene to separate in form of discrete fibrids upon the flashing off of said solvent in said space, and

(e) drying the resultant polyethylene fibrids.

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**4,110,386**

## SILICON CARBIDE SINTERED MOLDINGS AND A METHOD FOR PRODUCING SAID MOLDINGS

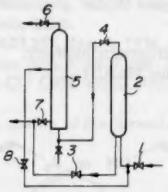
**Seishi Yajima; Josaburo Hayashi; Mamoru Omori; Masaaki Hamano, and Toetsu Shishido, all of Oharai, Japan, assignors to The Research Institute for Iron, Steel and Other Metals of the Tohoku University, Sendai, Japan**

**Filed Oct. 28, 1976, Ser. No. 736,659**

**Claims priority, application Japan, Nov. 10, 1975, 50-134122**

**Int. Cl.$^2$ C04B *35/56***

**U.S. Cl. 264—29.5** **8 Claims**




1. In a method for producing compact SiC sintered moldings, which comprises

(a) mixing SiC powder with 0.3–30% by weight of binder consisting essentially of organosilicon high molecular weight compounds in which Si and C are main skeleton components and which are produced through polycondensation reaction of polysilane compounds having Si-Si bond,

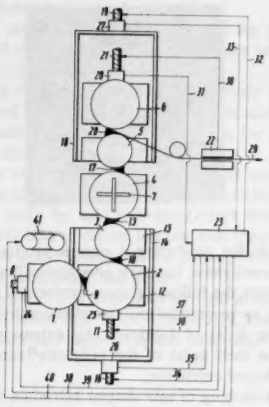
(b) molding the mixture under a pressure into a desired shape, and

(c) heating the formed molding at a temperature of 800–2,200° C. under at least one atmosphere selected from the group consisting of vacuum, inert gas, CO gas and hydrogen gas to product an SiC sintered molding, the improvement which comprises subjecting said SiC sintered molding to at least one treatment which comprises impregnating the SiC sintered molding with said organosilicon high molecular weight compound used as the binder in step (a) above, and heat treating the resulting impregnated SiC sintered molding at a temperature of 700°–1,400° C. under at least one atmosphere selected from the group consisting of vacuum, an inert gas, CO gas and hydrogen gas.

## 4,110,387
## METHOD OF CONTROLLING OPERATION OF A MULTI-ROLL CALENDER

Willi Wöckener; Werner Pawelczyk, and Klaus-Dieter Marquardt, all of Hanover, Fed. Rep. of Germany, assignors to Hermann Berstorff Maschinenbau GmbH, Hannover-Kleefeld, Fed. Rep. of Germany

Filed Sep. 28, 1976, Ser. No. 727,529
Claims priority, application Fed. Rep. of Germany, Oct. 1, 1975, 2543738
Int. Cl.[2] B29D 7/14
U.S. Cl. 264—40.5 5 Claims



1. A method of controlling a multi-roll calender for producing a sheet of elastomeric material, in which a series of rolls are mounted in a calender frame and controllably spaced from one another to provide a series of variable gaps through which the material is sequentially passed, comprising the steps of:

(a) sensing the pressure of material being calendered in the roll gaps of the calender.

(b) adjusting the width of the gaps on opposite sides of certain of said rolls which are subjected to roll gap pressures at substantially diametrically opposite sides thereof so as to make the difference in pressure in the gaps on said opposite sides as small as possible, thereby reducing the flexion on those rolls, and

(c) maintaining such pressures substantially constant.

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## 4,110,388
## METHOD AND A MOULD FOR PRODUCING AN INSULATING UNIT, IN PARTICULAR A BUILDING UNIT

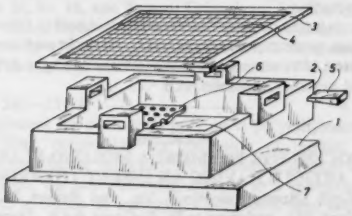
Ole Wiene, Farum, Denmark, assignor to Permataet Kobenhavn A/S, Bagsvaerd, Denmark

Filed Mar. 25, 1977, Ser. No. 781,518
Claims priority, application Denmark, Mar. 31, 1976, 1495/76
Int. Cl.[2] B28B 1/08
U.S. Cl. 264—71 25 Claims

1. A method of producing an insulating unit which is a matrix of a hydraulic binding material in which is embedded expanded, polymeric granules, comprising

disposing said granules of a size of 0.5 to 15 mm and of a density of 0.01 to 0.04 grams per cubic centimeter into a mold to fill at least a part of the mold and densely packing the granules therein;

maintaining said granules in a densely packed state in said mold by disposing over the top of said granules a net or a screen plate which is secured to the mold; and, while said granules are maintained in said densely packed state, pouring said binding material, having a thin creamy consistency into the mold to produce a closed-cell matrix about said granules.



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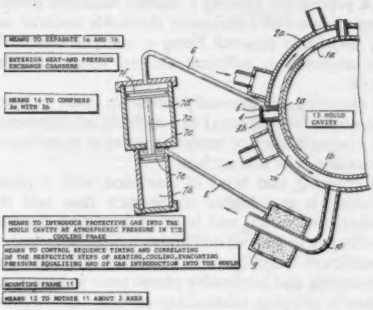
## 4,110,389
## METHOD AND APPARATUS FOR ROTATIONAL MOLDING WITH EVACUATED GUARD CHAMBER IN MOLD FLANGES

Herbert Giehler, Dautphe-Willhelmshutte, and Wilfried Grau, Wolfgruben, both of Fed. Rep. of Germany, assignors to Elkamet/Lahn Kunststoff GmbH/Werk, Biedenkopf, Fed. Rep. of Germany

Filed Jul. 7, 1976, Ser. No. 703,204
Claims priority, application Fed. Rep. of Germany, Jul. 7, 1975, 2530211
Int. Cl.[2] B29C 5/04; B29D 23/08
U.S. Cl. 264—89 20 Claims


MEANS TO SEPARATE 1a AND 1b
EXTERIOR HEAT-AND PRESSURE EXCHANGE CHAMBERS
MEANS 1a TO COMPRESS 3a WITH 3b
MOULD CAVITY
MEANS TO INTRODUCE PROTECTIVE GAS INTO THE MOULD CAVITY AT ATMOSPHERIC PRESSURE IN THE COOLING PHASE
MEANS TO CONTROL SEQUENCE TIMING AND CORRELATING OF THE RESPECTIVE STEPS OF HEATING, COOLING, EVACUATING PRESSURE EQUALISING AND OF GAS INTRODUCTION INTO THE MOULD
MOUNTING FRAME 11
MEANS 12 TO ROTATE 11 ABOUT 2 AXES

1. In a method of rotationally moulding a hollow article from a hardenable moulding material, said method including the steps of heating and cooling said moulding material during rotation of said mould, the improvement comprising:

A. providing a rotational mould having two mould halves defining a mould cavity therebetween, each of said mould halves having a jacket thereabout and spaced therefrom to define a jacket space;

each of said mould halves having mating flanges extending therefrom;

said flanges cooperating with a sealing member to define a pressure chamber therebetween;

B. placig said moulding material in said mould cavity;

C. passing a heating fluid through said jacket space to perform said heating step;

D. passing a cooling fluid through said jacket to perform said cooling step;

E. evacuating vapors from said mould cavity during said heating step;

F. pressuring said mould cavity during said cooling step;

G. continuously maintaining a pressure in said pressure chamber, during said heating and cooling at least as low as pressure in said mould cavity;

H. passing said heating fluid leaving said jacket space through a steam generator, generating steam thereby, and

I. actuating a vacuum means by said steam to perform said evacuating:

J. passing said cooling fluid leaving said jacket through said steam generator and condensing steam in said steam generator, to reverse said vacuum means and raise pressure in said pressure chamber.

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**4,110,390**

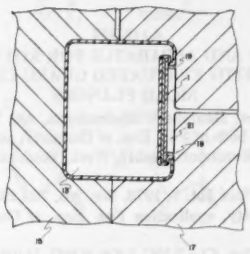
## PROCESS FOR FORMING A MOLDED PLASTIC ARTICLE HAVING AN INSERT THEREIN

**Tyler Keith Olcott, Valentines, Va., and Robert M. Miller, Lakeland, Fla., assignors to W. R. Grace & Co., Duncan, S.C.**

**Filed Oct. 18, 1976, Ser. No. 733,549**

**Int. Cl.² B29C *17/07*; B29D *3/00***

**U.S. Cl. 264—90** **8 Claims**



1. A process for forming a molded hardened plastic article having an insert of a thermally shockable material said thermally shockable material being a material which fractures when subjected to sufficient thermal stress comprising the steps of:

(a) disposing said thermally shockable insert so as to expose a surface of said insert to a molding environment;

(b) placing a layer of insulating material in contiguous relationship with said surface;

(c) covering said layer of insulation with a plastic mass which is at a higher temperature than said thermally shockable insert, said layer of insulating material being effective to prevent said higher temperature from creating sufficient thermal stress to fracture said insert; and

(d) cooling said hardenable plastic mass to harden said mass into a gripping relationship partially encompassing said thermally shockable insert.

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**4,110,391**

## PROCESS FOR THE MANUFACTURE OF MOLDED ARTICLES FROM POLYOLEFINS WITH MOLECULAR WEIGHTS OF AT LEAST ONE MILLION

**Josef Berzen, Oberhausen, and Johannes Theyssen, Duisburg, both of Fed. Rep. of Germany, assignors to Ruhrchemie Aktiengesellschaft, Oberhausen, Fed. Rep. of Germany**

**Filed Jul. 27, 1977, Ser. No. 819,536**

**Claims priority, application Fed. Rep. of Germany, Jul. 31, 1976, 2634537**

**Int. Cl.² B29C *3/00***

**U.S. Cl. 264—120** **13 Claims**

1. A process for the manufacture of a molded article from a powder form of a polyolefin of molecular weight of at least one million which comprises introducing a homopolymer of ethylene or a copolymer of ethylene with an α-olefin of 3-10 carbon atoms having a molecular weight of at least one million into a mold loosely closed with a plug, heating the same in said mold in an inert atmosphere at a temperature of 150° to 250° C whereby said polyolefin is transformed into a rubbery-elastic state, thereafter compressing said polyolefin in said mold for at least two minutes at a pressure of 2.5 to 25 N/mm² and thereafter compressing said polyolefin for at least one minute at a pressure of 40 to 100 N/mm².

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**4,110,392**

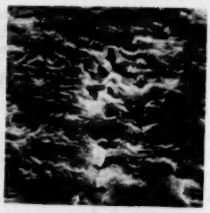
## PRODUCTION OF POROUS SINTERED PTFE PRODUCTS

**Etsuo Yamazaki, Iruma, Japan, assignor to W. L. Gore & Associates, Inc., Newark, Del.**

**Filed Dec. 17, 1976, Ser. No. 751,675**

**Int. Cl.² B29D *7/24, 27/00***

**U.S. Cl. 264—127** **6 Claims**



1. A process for producing a porous product of sintered polytetrafluoroethylene, having a pore size of less than 2000Å, which comprises the following steps performed in sequence:

(a) shaping an unsintered polytetrafluoroethylene mixture, containing a liquid lubricant, by extrusion, below the crystalline melt point of the polytetrafluoroethylene, to form a shaped extrudate;

(b) a first stretching of said shaped extrudate in at least one direction at a temperature below about 327° C;

(c) free sintering by heating said stretched shaped extrudate to a temperature above 327° C, said stretched shaped article being unrestrained and allowed to shrink to almost the same size it had been before stretching; and

(d) a second stretching of said sintered, stretched, shaped extrudate at a temperature below the crystalline melt point at a speed in the range of about $1 \times 10^2$ to about $2 \times 10^6$ mm/min.

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**4,110,393**

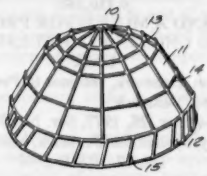
## METHOD OF MAKING SIMULATED THREE-DIMENSIONAL STAINED GLASS OBJECTS

**Charles Edward Trame, Mequon, Wis., assignor to Everbrite Electric Signs, Inc., South Milwaukee, Wis.**

**Filed Jan. 23, 1978, Ser. No. 871,302**

**Int. Cl.² B29C *5/00*; B29F *1/00***

**U.S. Cl. 264—132** **7 Claims**



1. A method for making three-dimensional, non-planar contoured simulated stained glass articles composed of an array of simulated stained glass facets at least some of which are disposed in different planes than others, said facets being bounded by simulated solder joints between them which joints are in relief relative to said facets, said method comprising the steps of:

providing a model of said article which has facets and relieved solder joints that are to correspond with the true

shape of the finished article formed thereon, said facets on the model being textured similar to stained glass,

providing a first mold made with said model in which planar areas and grooves are formed corresponding with said facets and said relieved solder joints, respectively,

preforming a sheet of resin with said mold to produce an object corresponding with said model,

projecting points on the three-dimensional preform, that delineate said facets and said solder joints, onto a plane sheet having coordinates and connecting coordinate points to form outlines of said facets and joints that are variously distorted in accordance with the amount by which zones on said preform distort during preforming from a planar to a non-planar object,

applying a coating on said planar sheet for coloring said facets and solder joints in correspondence with the colors desired in the simulated article,

reproducing the colored pattern of variously distorted and undistorted facets and solder joints from said planar sheet on a plurality of individual resin sheets for making additional preforms,

shaping one of said individual resin sheets under the influence of heat and pressure in a mold corresponding with said first mold for said individual sheet and the colored patterns thereon to distort to their true shapes in substantially exact coincidence with the corresponding facets and grooves in said mold, and then

molding a layer of hot fluid resin to bond to said preformed individual sheet and form a relatively thick and rigid article when said resin cools and solidifies.

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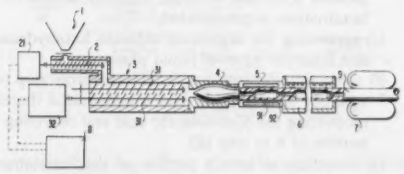
**4,110,394**

## PROCESS FOR EXTRUSION FORMING OF RESIN FORMED BODY HAVING DIFFERENT THICKNESS

**Teizo Shimada, Takatsuki; Takeshi Kita, Asaka; Kiyoshi Mochizuki, Joyo, and Takahiro Komiya, Kamifukuoka, all of Japan, assignors to Sekisui Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

**Filed May 12, 1976, Ser. No. 685,604**
**Claims priority, application Japan, May 16, 1975, 50-59032**
**Int. Cl.² B29D *23/04***
**U.S. Cl. 264—167** **5 Claims**



1. In a resin body extrusion process of the type wherein resin raw material is fed into an extruder wherein an extruder screw means mixes, melts and moves said resin therethrough to a shape forming means, and wherein said body is pulled by a take-up means, an improved process for altering the thickness of said resin body comprising,

altering the feed rate of resin raw material into said extruder, and altering the screw rotation rate of said extruder by amounts to maintain the quantity of resin within the extruder substantially constant while varying significantly the quantity extrusion rate leaving said extruder.

**4,110,395**

## PROCESS FOR PRODUCING POLYMERIC FILMS FROM CRYSTALLIZABLE POLYESTERS

**Modest Sergeevich Akutin, Bolshoi Tishinsky pereulok, 26, korpus 16, kv. 16, and Tamara Grigorievna Levina, Ljusinovskaya ulitsa, 66, kv. 242a, both of Moscow, U.S.S.R.**

**Continuation of Ser. No. 551,850, Feb. 21, 1975, abandoned. This application Oct. 19, 1976, Ser. No. 733,944**
**Int. Cl.² B29D *7/24***
**U.S. Cl. 264—210 R** **4 Claims**

1. A process for producing polymeric polyethyleneterephthalate films, comprising the extrusion of molten polyethyleneterephthalate polymer onto a receiving surface; cooling said polymer on said receiving surface to a temperature of 20°–80° C. to obtain an amorphous polymeric film; heat treating said film at 130°–190° C. to obtain a degree of crystallinity of the film of from 5 to 50%; biaxially orienting said film at 130°–250° C.; thermal fixation thereof at 170°–250° C. and cooling to 20°–30° C.

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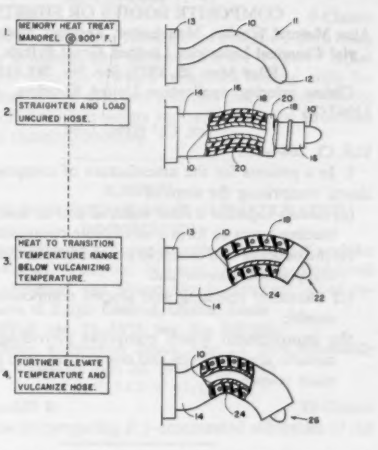
**4,110,396**

## CURVED TUBULAR ARTICLES AND METHOD

**Linda M. Reynolds, Goleta, Calif., assignor to The Gates Rubber Company, Denver, Colo.**

**Filed May 15, 1974, Ser. No. 470,249**
**Int. Cl.² B29C *25/00***
**U.S. Cl. 264—236** **17 Claims**


1. MEMORY HEAT TREAT MANDREL @ 900° F.
2. STRAIGHTEN AND LOAD UNCURED HOSE.
3. HEAT TO TRANSITION TEMPERATURE RANGE BELOW VULCANIZING TEMPERATURE
4. FURTHER ELEVATE TEMPERATURE AND VULCANIZE HOSE.

1. A method for producing curved tubular elastomeric articles utilizing a heat recoverable mandrel which has been memory heat treated at a temperature well above the vulcanizing temperature of the elastomeric article and at a preselected curvilinear configuration, comprising sequentially the steps of:

deforming the mandrel from its preselected curvilinear configuration;

loading the tubular article in at least a partially uncured state on to the mandrel to form a loaded mandrel, said mandrel having a transition temperature range whose lower value is above the softening point of the elastomeric article;

heating the loaded mandrel up through the transition temperature range of the mandrel which is below the vulcanizing temperature, whereby the mandrel takes on a configuration substantially that of said preselected curvilinear configuration during which said elastomeric article is in an uncured, softened state; and

vulcanizing the elastomeric article.

9. A method for producing curved hose utilizing a heat recoverable metal alloy mandrel which has been memory heat treated at a temperature well above the vulcanizing temperature of the hose and at a preselected curvilinear configuration, comprising sequentially the steps of:

deforming the mandrel from its preselected curvilinear configuration to a shape having lesser curvature than the preselected curvilinear configuration;

loading the hose in at least a partially uncured state on to the mandrel to form a loaded mandrel, said mandrel having a transition temperature range which is below the vulcanizing temperature of the hose article, and above the softening temperature of the rubber;

heating the loaded mandrel up through its transition temperature range whereby the rubber is rendered flowable and in a plastic state, whereby the mandrel takes on a configuration substantially that of said preselected curvilinear configuration;

vulcanizing the elastomeric article;

cooling the loaded mandrel to below its transition temperature range;

plastically deforming the loaded mandrel to a desired configuration of lesser curvature than the preselected curvilinear configuration; and

unloading the curved hose article.

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## 4,110,397
## COMPOSITE BODIES OR SHEETS

**Alan Metcalf Wooler, Manchester, England, assignor to Imperial Chemical Industries Limited, Great Britain**

**Filed Mar. 25, 1977, Ser. No. 781,416**

**Claims priority, application United Kingdom, Apr. 6, 1976, 13967/76**

**Int. Cl.² B29C *1/04***

**U.S. Cl. 264—338** **14 Claims**

1. In a process for the manufacture of composite bodies or sheets comprising the steps of

(a) mixing together a filler material and an isocyanate-based binding agent to form a mouldable composition;

(b) introducing said composition to a mould and shaping said composition therein; and

(c) thereafter releasing said shaped composition from said mould;

the improvement which comprises providing a film of a metallic soap between said composition and said mould to assist release.

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## 4,110,398
## METAL SEPARATION FROM DRAGSTREAM MATERIAL OF REFINING PROCESS

**Charles W. Selvidge, Westmont; Kenneth A. Morgan, Hoffman Estates, and Robert R. Frame, Glenview, all of Ill., assignors to UOP Inc., Des Plaines, Ill.**

**Filed Apr. 8, 1977, Ser. No. 785,900**

**Int. Cl.² C01G *31/00, 49/00, 53/00***

**U.S. Cl. 423—62** **8 Claims**

1. A process which comprises agitating a dragstream resulting from the refining of a crude feed stock containing vanadium and nickel with naphtha at a temperature of from about 100° to about 250° C., a pressure of from about 1 to about 50 atmospheres, and a time period of from about 0.5 to about 10 hours, the solids content of the dragstream being present in a range of from about 5% to about 20% by weight of said naphtha, separating liquid from solid, calcining the latter at a temperature of from about 300° to about 900° C. for a time period of at least about 1 hour, and recovering the calcined solid material containing vanadium and nickel.

## 4,110,399
## PROCESS FOR THE EXTRACTION OF ALUMINA FROM ALUMINUM-CONTAINING SILICATES

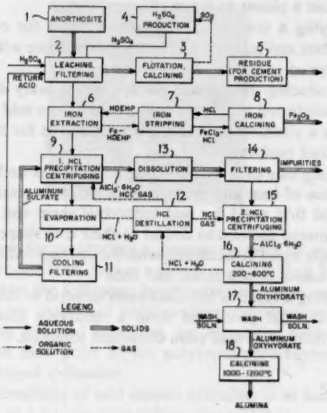
**Bjorn Gaudernack; Norvald Gjelsvik, both of Oslo, and Leif Farbu, Strommen, all of Norway, assignors to Institutt for Atomenergi, Kjeller, Norway**

**Filed Mar. 30, 1977, Ser. No. 782,826**

**Claims priority, application Norway, Apr. 2, 1976, 761136**

**Int. Cl.² C01F *7/22, 7/26***

**U.S. Cl. 423—112** **12 Claims**




1. A process for the extraction of alumina from aluminum-containing silicates comprising:

(a) treating an aluminum-containing silicate with an aqueous solution comprising sulfuric acid whereby a substantial portion of the aluminum is dissolved;

(b) separating the solids of step (a) from the liquid portion;

(c) treating at least a part of the aqueous liquid portion from step (b) with an organic liquid substantially immiscible with the aqueous solution and containing an organic extractant capable of preferential extraction of iron over aluminum whereby iron is extracted into the organic liquid phase;

(d) separating the aqueous liquid phase from the organic liquid phase and treating the aqueous liquid phase with gaseous hydrogen chloride whereby aluminum chloride hexahydrate is precipitated;

(e) separating the aluminum chloride hexahydrate precipitate from the aqueous liquid phase;

(f) subjecting the aqueous liquid phase from step (e) to heat whereby hydrochloric acid is evaporated therefrom and recovering the hydrochloric acid and recycling at least a portion of it to step (d);

(g) recycling at least a portion of the remaining aqueous liquid phase of step (f) to step (a);

(h) calcining the aluminum chloride hexahydrate from step (e) at a temperature of from about 200° C to about 600° C whereby the aluminum chloride hexahydrate is converted to aluminum oxyhydrate and hydrochloric acid;

(i) separating the hydrochloric acid from the aluminum oxyhydrate;

(j) washing the aluminum oxyhydrate with water or dilute hydrochloric acid whereby any alkali metal chlorides and magnesium chlorides are removed; and

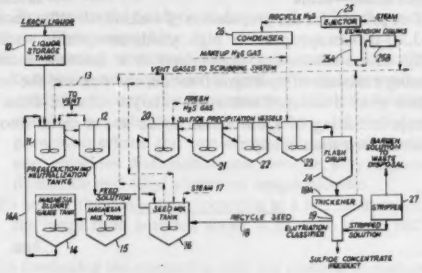
(k) calcining the aluminum oxyhydrate to alumina at a temperature above about 1000° C.

## 4,110,400

## SELECTIVE PRECIPITATION OF NICKEL AND COBALT SULFIDES FROM ACIDIC SULFATE SOLUTION

Mahesh C. Jha, Arvada; Gordon R. Wicker, Lakewood, and Gustavo A. Meyer, Arvada, all of Colo., assignors to Amax Inc., Greenwich, Conn.

Filed Aug. 1, 1977, Ser. No. 820,595
Int. Cl.[2] C01G 53/00
U.S. Cl. 423—141 17 Claims




1. A method of efficiently precipitating nickel as nickel sulfide from an acidic nickel sulfate solution containing up to 15 gpl nickel having a pH in the range of about 1.5 to 4 and a soluble inert sulfate salt which provide sulfate ions in an amount ranging from about 30 to 400 gpl as an acid buffer by combining with hydrogen ions formed during precipitation of nickel sulfide to form $HSO_4^{-1}$ which comprises,

adding a slurry of finely divided nickel sulfide to said solution to provide a seed concentration of at least about 75 gpl,

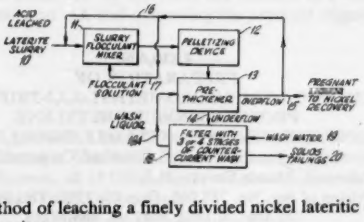
and then subjecting said solution to sulfide precipitation with $H_2S$ under pressure at a temperature of about 65° C to less than 100° C while vigorously agitating said solution until substantially complete sulfide precipitation of nickel obtains.

## 4,110,401

## SOLID-LIQUID SEPARATION OF LATERITE SLURRIES

Raul M. Hoover, Arvada; Guy W. Lussiez, Broomfield, both of Colo., and Hugh F. Reid, Pittsburgh, Calif., assignors to Amax Inc., Greenwich, Conn.

Filed Jul. 11, 1977, Ser. No. 814,203
Int. Cl.[2] C01G 53/10
U.S. Cl. 423—150 10 Claims




1. A method of leaching a finely divided nickel lateritic ore which comprises,

forming a slurry of said ore in an acid solution containing sulfuric acid in an amount ranging from about 0.1 to 0.5 pound of acid per pound of ore taken on the dry basis, said ore being less than about 270 mesh in size,

leaching said ore at a temperature of about 150° C. to 300° C. and a pressure of about 225 psig to 1750 psig to effect substantially complete solution of the nickel in said ore and form a pregnant liquor thereof and leave a slurry of fine tailings particles,

releasing the pressure on said leached slurry and passing said slurry to a flocculant mixer,

adding a small but effective amount of a flocculant to said slurry while mixing said slurry and continuing said mixing to effect flocculation of said tailings,

passing said flocculated slurry to a pre-thickener and thereby produce an overflow of said pregnant liquor and a thickened underflow of flocculated tailings, a portion of said pregnant liquor being removed and sent to nickel recovery with the remainder portion being recycled to the flocculant mixer,

passing said thickened flocculated slurry to a rotating pelletizing drum and subjecting said slurry to the rotational action of said drum to pelletize said tailings at a rotational speed ranging from over 20% to about 40% of the critical speed of said drum,

filtering said pelletized tailings and subjecting said filtered pellets to countercurrent washing to provide washed tailings and provide recycle wash liquor,

recycling said wash liquor to said pre-thickener,

and disposing of said washed pelletized tailings.

## 4,110,402

## RECOVERY OF STRONTIUM FROM BRINE THAT CONTAINS STRONTIUM AND CALCIUM

William C. Bauman; John M. Lee, and John D. Watson, all of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 24, 1976, Ser. No. 689,309
Int. Cl.[2] C01F 11/46
U.S. Cl. 423—166 9 Claims

1. A method of recovering strontium as a sulfate from a brine that contains strontium and calcium in a $Ca^{++}/Sr^{++}$ molar ratio of greater than 20/1 which comprises mixing, with the brine, strontium sulfate seed and a sulfate that is more soluble in water than is strontium sulfate and recovering the strontium sulfate that is thereby produced.

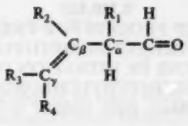
## 4,110,403

## PROCESS FOR PREPARING β,γ-UNSATURATED ALDEHYDES

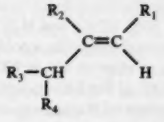
Yataro Ichikawa; Osamu Kobayashi, both of Iwakuni; Kazuhiko Soma, Kawasaki; Tatuyuki Naruchi, Iwakuni; Yoshiyuki Yamanaka, Iwakuni, and Nobuo Suzuki, Iwakuni, all of Japan, assignors to Teijin Limited, Osaka, Japan

Filed Apr. 21, 1975, Ser. No. 569,686
Claims priority, application Japan, Apr. 22, 1974, 49-44402; Apr. 22, 1974, 49-44403; Sep. 30, 1974, 49-111643
Int. Cl.[2] C07C 45/00
U.S. Cl. 260—603 R 19 Claims

9. A process for preparing β,γ-unsaturated aldehydes of the formula

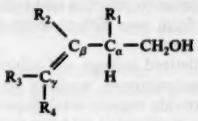


wherein $R_1$, $R_2$ and $R_3$ are identical or different and represent a hydrogen atom or a methyl group, and $R_4$ is a hydrogen atom or a linear or cyclic saturated or unsaturated hydrocarbon residue containing 1 to 6 carbon atoms, which comprises (1) reacting an olefin of the formula



wherein $R_1$, $R_2$, $R_3$ and $R_4$ are the same as defined above, with formaldehyde or a derivative capable of forming formalde-

hyde at the reaction temperature, at a reaction temperature of 200° to 340° C. in the absence of a solvent or in the presence of a non-aqueous organic solvent selected from the group consisting of halogenated hydrocarbons, diethyl ether, tetrahydrofuran, paradioxane, tetrahydropyran, aliphatic hydrocarbons, alicyclic hydrocarbons, aromatic hydrocarbons and dioxanes after pre-heating said formaldehyde or derivative to a temperature of 85° to 150° C. thereby to form a $\beta$, $\gamma$-unsaturated alcohol of the formula



wherein $R_1$, $R_2$, $R_3$ and $R_4$ are the same as defined above, and (2) contacting the $\beta,\gamma$-unsaturated alcohol in the vapor phase with metallic copper prepared by reduction of copper oxide having a specific surface area of 0.10 to 0.92 $m^2/g$ as a catalyst at a temperature of 200° to 280° C. in the presence of a carrier gas and in the substantial absence of oxygen.

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**4,110,404**

## HYDROCARBONYLATION

**William D. Schaeffer, Pomona, and Frank B. Booth, Placentia, both of Calif., assignors to Celanese Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 518,562, Jan. 4, 1966, abandoned. This application Jul. 10, 1969, Ser. No. 840,815**

**Int. Cl.[2] C07C *45/08***

**U.S. Cl. 260—604 HF** **2 Claims**

1. In a method for the hydroformylation of an olefin by adding carbon monoxide and hydrogen to the olefin, reacting said mixture in the presence of a hydroformylation catalyst and recovering the aldehyde product, the improvement which comprises conducting the reaction in the presence of a complex catalyst consisting essentially of rhodium and triethylenediamine the molar ratio of triethylenediamine to rhodium metal being within the range of from 0.023 to 2280.

2. The method of claim 1 wherein a reaction residue containing the complex catalyst is recovered and recycled to the hydroformylation reaction.

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**4,110,405**

## ONE STEP PROCESS FOR PREPARING 2,6-DINITRO-4-TRIFLUOROMETHYLCHLOROBENZENE BY NITRATION OF 4-TRIFLUOROMETHYLCHLOROBENZENE

**Mario Bornengo, Massa, Italy, assignor to Montedison S.p.A., Milan, Italy**

**Filed Oct. 21, 1977, Ser. No. 844,410**

**Claims priority, application Italy, Oct. 22, 1976, 28606 A/76**

**Int. Cl.[2] C07C *79/12***

**U.S. Cl. 260—646** **2 Claims**

1. A one-step process for preparing 2,6-dinitro-4-trifluorochlorobenzene from 4-trifluoromethylchlorobenzene which comprises adding 4-trifluoromethylchlorobenzene to a 1:5 to 1:6 mixture of about 90% $HNO_3$ and $H_2SO_4$ at 20% of $SO_3$, at a molar ratio of nitric acid to 4-trifluorochlorobenzene of 4.5:1, heating the resulting mixture to about 100° C for 3 hours and thereafter to about 110° C for 1 hour, with continued stirring, allowing the temperature of the mass to decrease to about 60° C to 70° C over a period of about 3 hours without stirring, and mixing the slurry thus obtained with ice and water to precipitate the 2,6-dinitro-4-trifluorochlorobenzene.

**4,110,406**

## PREPARATION OF 1-CHLORO-2-TRIFLUOROMETHYL-3,3,3-TRIFLUOROPROPENE FROM ISOBUTYLENE

**Louis G. Anello, Hamburg, and Richard F. Sweeney, Elma, both of N.Y., assignors to Allied Chemical Corporation, Morris Township, Morris County, N.J.**

**Filed Dec. 21, 1976, Ser. No. 753,065**

**Int. Cl.[2] C07C *17/20***

**U.S. Cl. 260—653.4** **18 Claims**

1. A process for the preparation of 1-chloro-2-trifluoromethyl-3,3,3-trifluoropropene in high yield, comprising catalytically chlorofluorinating isobutylene in a reaction zone by passing a mixture of hydrogen fluoride, chlorine and the isobutylene over a chlorofluorination catalyst selected from the group consisting of a chromium oxide and a metal fluoride chlorofluorination catalyst.

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**4,110,407**

## PREPARATION OF 1-CHLORO-2-TRIFLUOROMETHYL-3,3,3-TRIFLUOROPROPENE FROM ISOBUTANE

**Louis G. Anello, Hamburg; Richard F. Sweeney, Elma, and Bernard Sukornick, Williamsville, all of N.Y., assignors to Allied Chemical Corporation, Morris Township, Morris County, N.J.**

**Division of Ser. No. 754,386, Dec. 27, 1976, Pat. No. 4,081,487. This application Nov. 21, 1977, Ser. No. 853,363**

**Int. Cl.[2] C07C *17/20***

**U.S. Cl. 260—653.4** **17 Claims**

1. A process for the preparation of 1-chloro-2-trifluoromethyl-3,3,3-trifluoropropene in high yield, comprising prechlorinating an isobutane feed to such extent that the product of chlorination attains an average chlorine content of at least 4 chlorine atoms per molecule, and thence fluorinating said product of chlorination in a reaction zone by passing said product, together with hydrogen fluoride and chlorine, over a dehydro/chlorofluorination catalyst selected from the group consisting of a chromium oxide and a metal fluoride dehydro/-chlorofluorination catalyst.

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**4,110,408**

## PREPARATION OF 1-CHLORO-2-TRIFLUOROMETHYL-3,3,3-TRIFLUOROPROPENE FROM ISOBUTYLENE

**Louis G. Anello, Hamburg, and Richard F. Sweeney, Elma, both of N.Y., assignors to Allied Chemical Corporation, Morris Township, Morris County, N.J.**

**Division of Ser. No. 753,065, Dec. 21, 1976. This application Dec. 7, 1977, Ser. No. 858,131**

**Int. Cl.[2] C07C *17/20***

**U.S. Cl. 260—653.4** **17 Claims**

1. A process for the preparation of 1-chloro-2-trifluoromethyl-3,3,3-trifluoropropene in high yield, comprising prechlorinating an isobutylene feed to such extent that the product of chlorination attains an average chlorine content of at least 4 chlorine atoms per molecule, and thence fluorinating said product of chlorination in a reaction zone by passing said product, together with hydrogen fluoride and chlorine, over a chlorofluorination catalyst selected from the group consisting of a chromium oxide and a metal fluoride chlorofluorination catalyst.

4,110,409

## PROCESS FOR MAKING CODIMERS OF NORBORNADIENE AND ALKYNES USING A COBALT CATALYST

Harry K. Myers, Jr., Aston; James E. Lyons, Wallingford, and Abraham Schneider, Overbrook Hills, all of Pa., assignors to Suntech, Inc., Wayne, Pa.

Filed Oct. 17, 1977, Ser. No. 842,812
Int. Cl.[2] C07C *13/28, 15/12*
U.S. Cl. 260—666 PY 11 Claims

1. Process for the catalytic codimerization of norbornadiene with an alkyne comprising:

(a) contacting norbornadiene and an acetone free alkyne containing no more than 12 carbons in the presence of a catalytic amount of a homogeneous catalytic system of cobaltic or cobaltous acetylacetonate, 1,2-bisdiphenylphosphino ethane and one of the following alkyl aluminum chlorides: diethylaluminum chloride, ethyl aluminum dichloride and ethyl aluminum sesquichloride;

(b) having the contacting occurring at a temperature within the range from between about −20° C to about 100° C; and

(c) continuing the contacting until the codimer of norbornadiene and the alkyne is prepared.

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4,110,410

## OLIGOMERIZATION OF OLEFINS

Ji-Yong Ryu, Des Plaines, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 645,118, Dec. 29, 1975, Pat. No. 4,048,109. This application Jun. 22, 1977, Ser. No. 808,932
Int. Cl.[2] C07C *3/18*
U.S. Cl. 260—683.15 B 10 Claims

1. A process for the oligomerization of an olefinic hydrocarbon which contains from 2 to about 6 carbon atoms which comprises oligomerizing said hydrocarbon at oligomerization conditions in the presence of a catalyst which has been prepared by heating a metal oxide which possesses surface hydroxyl groups at a temperature in the range of from about 400° C. to about 600° C., contacting said metal oxide with titanium tetrachloride vapor in a series of steps at progressively higher temperatures within the range of from about 50° C. to about 600° C. to deposit titanium tetrachloride on the metal oxide, and thereafter heating the impregnated metal oxide in contact with hydrogen gas at a temperature in the range of from about 300° C. to about 700° C. to reduce the titanium to a valence state of less than +4, and recovering the resultant oligomer.

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4,110,411

## POLYESTER COPOLYMER COMPOSITIONS

Hiroshi Imanaka; Yoshihiko Kijima; Chikara Sugitawa, and Misao Sumoto, all of Otsu, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Filed Feb. 27, 1976, Ser. No. 662,283
Claims priority, application Japan, Feb. 27, 1975, 50-24738
Int. Cl.[2] C08L *67/06*
U.S. Cl. 260—873 10 Claims

1. A composition comprising an intimate mixture of an elastomer from a segmented thermoplastic polyester copolymer, and at least one polyolefin, wherein said segmented thermoplastic polyester copolymer consists essentially of (1) high-melting polyester segments, a component of which can singly form a high polymer having a melting point greater than 150° C and (2) low-melting polymer segments having a molecular weight between 400 and 6,000, a component of which has a melting or softening point of less than 80° C.

4,110,412

## DIFUNCTIONAL TERMINATED MACROMOLECULAR MONOMERS AND CONDENSATION COPOLYMERS PRODUCED THEREFROM

Morris J. Danzig, Skokie, and Mutong T. Chiang, Palos Heights, both of Ill., assignors to CPC International Inc., Englewood Cliffs, N.J.

Division of Ser. No. 686,776, May 17, 1976, Pat. No. 4,068,050. This application Dec. 27, 1977, Ser. No. 864,830
Int. Cl.[2] C08F *8/08, 289/00*
U.S. Cl. 260—873 12 Claims

1. Chemically joined, phase separated graft copolymers comprising copolymers of:

(1) from about 1% to about 95% by weight of copolymerizable macromolecular monomers having a substantially uniform molecular weight distribution and having a copolymerizable terminal moiety containing two functional groups of substantially equivalent reactivity in participating in a condensation copolymerization reaction; and

(2) from about 99% to about 5% by weight of at least two different copolymerizable condensible comonomers or the prepolymer prepared from the condensation of such comonomers, the copolymerizable condensible comonomers forming the polymeric backbones of said graft copolymers and the copolymerizable macromolecular monomers forming linear polymeric sidechains of said graft copolymers, wherein:

(a) the polymeric backbones of the graft copolymer are comprised of polymerized units of at least two different condensible difunctional comonomers, said condensible comonomers being comprised of at least one comonomer of the formula:

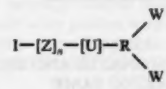
(i) X-L-X

wherein X is selected from the group consisting of $—CO_2H$, —COCl, $—CO_2R''$, —NCO, $—SO_2Cl$ and —OCOCl, wherein R″ is an alkyl group; and L is an aliphatic, aryl or aralkyl group; and at least one other comonomer of the formula:

(ii) Y-M-Y

wherein Y is selected from the group consisting of —OH, $—NH_2$, and —SH, and M is an aliphatic, aryl or aralkyl group; and

(b) the linear polymeric sidechains of the graft copolymer are comprised of macromolecular monomers having a substantially uniform molecular weight distribution such that the the ratio of Mw/Mn is less than about 1.1, said macromolecular monomers being represented by the formula



(iii)

wherein I is the residue of an alkali metal alkyl or alkali metal alkoxide monofunctional anionic initiator; Z represents a polymerized unit of at least one anionically polymerizable monomer; U is a capping agent which is the reaction product of a compound that is capable of reacting with the carbanion of a living polymer to produce an anion of sufficiently lower basicity than the carbanion of the original living polymer so as not to substantially react with the difunctional groups, W, of a halogen containing terminating agent, from which the terminal moiety is formed, but sufficiently reactive to react with the halogen on the terminating agent; R is an aliphatic, aryl or aralkyl group; W is a member selected from the group consisting of $—CO_2H$, —COCl, $—CO_2R'$, —NCO, $—SO_2Cl$, —OCOCl, —OH, $—NH_2$ and —SH, wherein R′ is an alkyl group; and $n$ is a positive integer such that the molecular weight of the macromolecular monomers is in the range of from about 2,000 to about 50,000; said macromolecular monomers being chemically joined to the backbone copolymer by condensation copo-

lymerization of the W groups on said macromolecular monomers and the two different difunctional comonomers.

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**4,110,413**

## THERMOPLASTIC HIGH ACRYLONITRILE RESINS

George A. Kuhar, Greensburg, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 553,776, Feb. 27, 1975, abandoned.
This application Mar. 31, 1976, Ser. No. 672,360
Int. Cl.[2] C08L 33/20
U.S. Cl. 260—879 6 Claims

1. In a method of polymerizing high acrylonitrile resins in suspension polymerization systems wherein the polymerization system contains acrylonitrile in a concentration of from 90 to 100 parts, water in a concentration of from 150 to 300 parts, and a comonomer in a concentration of from 0 to 10 parts, the improvement comprising the addition of a finely divided resin to said polymerization system having a particle size in the range of about 50 to about 200 U.S. Standard mesh selected from the group consisting of acrylonitrile/butadiene/styrene resins, and styrene/acrylonitrile resins in a concentration of from 1.5 to 90 parts by weight to act as a suspending agent during the polymerization and as a processing aid in the finished high acrylonitrile resin.

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**4,110,414**

## THERMOPLASTIC POLYMER BLENDS OF ETHYLENE-PROPYLENE (EP) COPOLYMER WITH POLYETHYLENE

Geoffrey Andrew Lindsay, Hudson, and Paul Thomas Stricharczuk, Solon, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed Sep. 1, 1976, Ser. No. 719,487
Int. Cl.[2] C08L 23/16
U.S. Cl. 260—897 A 6 Claims

1. A thermoplastic polymer blend comprising (1) an EP copolymer consisting essentially of interpolymerized units of about 65 to about 75 percent by weight of ethylene and about 25 percent to about 35 percent by weight of propylene, said polymer having a Mooney Viscosity (ML-4 at 150° C.) of from about 30 to about 80 and a methylene run index of over about 20/1 and (2) from about 5 parts to about 200 parts by weight per 100 parts by weight of the EP copolymer of a polyethylene polymer having a density of about 0.91 to 0.94 grams/cc.

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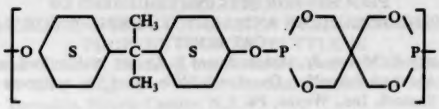
**4,110,415**

## METHYLOL PHOSPHONATES AND PROCESS FOR MAKING SAME

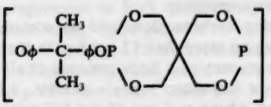
Eugene Joseph Boros, South Charleston, and Anthony Joseph Papa, Saint Albans, both of W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Filed Dec. 29, 1975, Ser. No. 645,133
Int. Cl.[2] C07F 9/40; C08J 9/00
U.S. Cl. 260—953 10 Claims

4. A process for producing polymethylol polyphosphonates which comprises reacting formaldehyde with a trisubstituted phosphite selected from the group consisting of heptakis (dipropylene glycol) triphosphite; tris (dipropylene glycol) phosphite; diisodecyl pentaerythritol diphosphite; distearyl pentaerythritol diphosphite; bis (neopentylglycol)1,4-cyclohexanedimethylene phosphite; dineodyl pentaerythritol diphosphite; bis neopentylglycol triethyleneglycol diphosphite; diphenylpentaerythritol diphosphite; tetra (diphenylphosphite) pentaerylthritol tetrakis (nonylphenyl) polypropyleneglycol diphosphite; a polyphosphite characterized by the following repeating units:



a polyphosphite characterized by the following repeating units:



and mixtures thereof, the reaction being carried out in the presence of a polyol as a protic solvent when the trisubstituted phosphite does not contain polyhydroxyl functionality.

8. The process of claim 4 wherein the polyol is present in an amount sufficient to introduce at least two hydroxyl groups per molecule of the trisubstituted phosphite.

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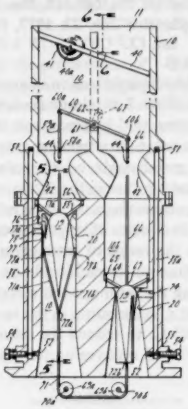
**4,110,416**

## SONIC THROTTLE FOR AUTOMOBILE

Jorma O. Sarto, Orchard Lake, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Jun. 16, 1977, Ser. No. 807,099
Int. Cl.[2] F02M 9/14
U.S. Cl. 261—23 A 15 Claims



1. In a fuel supply means for an automobile engine, inlet induction passage means, fuel supply means for supplying fuel to said passage means, said passage means having upstream inlet means for receiving air and having two downstream outlet conduits for discharging a fuel-air mixture, means defining a part of each outlet conduit downstream of said fuel supply means comprising an orifice member and an associated closure member arranged for relative movement with respect to each other axially of their associated conduit, each orifice member having an orifice for conducting the flow of said mixture therethrough, each closure member being cooperable with its associated orifice member to effect a variable restriction for the associated orifice in accordance with the relative axial positions of said members, and means for effecting said relative movement to decrease or increase the restrictions of the two orifices in unison comprising means for connecting the orifice member in one outlet conduit with the closure member in the other outlet conduit for moving one of the last named

two members in the direction of the mixture flow in the associated outlet conduit and for simultaneously moving the other of the last named two members oppositely to the direction of the mixture flow in the associated outlet conduit.

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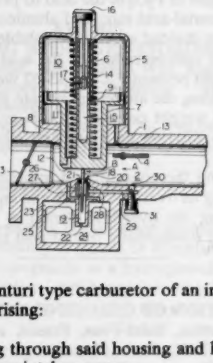
**4,110,417**

## VARIABLE VENTURI TYPE CARBURETOR

**Masami Konishi, Toyota; Norihiko Nakamura, Mishima; Takaaki Itou, and Kazuo Kikuchi, both of Susono, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan**

**Filed Mar. 18, 1977, Ser. No. 778,964**
**Claims priority, application Japan, Dec. 29, 1976, 51-159469**
**Int. Cl.[2] F02M *9/06***
**U.S. Cl. 261—39 A** **14 Claims**



1. A variable venturi type carburetor of an internal combustion engine, comprising:
- a housing;
- a bore extending through said housing and having an inner wall defining an intake passage;
- a suction piston movably mounted in said housing and having a bottom end face projecting into said intake passage, said bottom end face of said suction piston and said inner wall of said intake passage defining a venturi, said suction piston moving up and down in response to a change in the vacuum produced in said intake passage downstream of said venturi for maintaining the velocity of air flowing into said venturi at a constant value;
- a jet disposed on the inner wall of said intake passage at a position facing said bottom end face of said suction piston;
- a needle fixed into said bottom end face of said suction piston and entering into said jet, said jet and said needle defining an annular opening through which fuel is injected into said intake passage;
- a fuel reservoir in said housing;
- a fuel supply passage disposed in said housing and communicating said fuel reservoir with said jet;
- a vacuum passage communicating said fuel reservoir with said venturi downstream of said needle for producing a vacuum in said fuel supply passage;
- an air bleed passage communicating said fuel supply passage with the atmosphere; and
- a bubble generating pipe made of sintered metal being disposed in said fuel supply passage at a position in which said air bleed passage opens into said fuel supply passage for creating fine bubbles of air in the fuel contained in said fuel supply passage.

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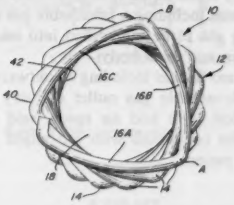
**4,110,418**

## COIL PACKING

**Ted Martin, 927 Castlewood Ter., Chicago, Ill. 60640**

**Filed May 13, 1977, Ser. No. 796,558**
**Int. Cl.[2] B01D *53/20, 47/14***
**U.S. Cl. 261—98** **7 Claims**

1. The combination of a tower for bringing about contact between a liquid and a gas, said tower having a first inlet and a first outlet for said liquid and a second inlet and a second outlet for said gas, and a packing comprising a continuous coil having at least three turns, each of said turns having at least three sides, each turn of said packing being rotatably offset



relative to each adjacent turn, and said coil defining an opening between the sides of each turn.

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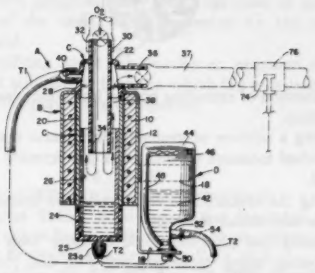
**4,110,419**

## HIGH-VOLUME DISPOSABLE AND SEMI-DISPOSABLE CARTRIDGE HUMIDIFIER WITH SELF-CONTAINED CARTRIDGE STERILIZING MEANS, AND RELATED METHOD

**Kenneth G. Miller, Elk Grove Village, Ill., assignor to Respiratory Care, Inc., Arlington Heights, Ill.**

**Continuation of Ser. No. 569,490, Apr. 18, 1975, abandoned.**
**This application Aug. 19, 1977, Ser. No. 826,119**
**Int. Cl.[2] A61M *15/00***
**U.S. Cl. 261—142** **4 Claims**



1. Cartridge type humidifying apparatus for use with a heating means for humidifying and heating a breathable gas to be inhaled by a patient undergoing inhalation thereapy, said apparatus comprising in combination:
- (a) humidifier cartridge module means embodying a tubular cartridge main body portion with an inner peripheral wall;
- (b) said humidifier cartridge module means also including an upper end portion with cap means attached to said main body;
- (c) said humidifier cartridge module means including a lower end portion terminating in a transverse wall and adapted and constructed to retain a humidifying liquid, said transverse wall having liquid inlet means adapted to be fluidly connected via conduit means with a liquid outlet means of an external liquid source;
- (d) said humidifier cartridge module means further comprising liquid absorption means including an open center generally tubular liquid-absorption column member with an inner peripheral face constituting an evaporating surface for humidifying liquid disposed generally contiguously and coextensive with a substantial part of said cartridge main body and said lower end portion adapted and constructed to be wetted directly by the humidifying liquid when liquid is in said lower end portion, and to convey by capillary action the liquid upwardly of said absorpting means and onto said evaporating surface;
- (e) said upper end portion cap means of said humidifier

cartridge module means of paragraph (b) together with a portion of said main body providing an air space above the humidifying liquid level in said lower end portion of said paragraph (c) when liquid is in said lower end portion;

(f) said cap means including a breathable gas inlet feed pipe for directing gas to be humidified into said module and terminating in said main body;

(g) said cap means further including an outwardly projecting humidified breathable gas outlet delivery pipe in fluid communication with said air space, said delivery pipe adapted to be connected with an output delivery tube leading to a patient.

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## 4,110,420
## METHOD FOR EXTRUDING POROUS IRRIGATION PIPE

James E. Turner, Southlake, Tex., assignor to Cry Baby, Inc., Houston, Tex.

Division of Ser. No. 445,866, Feb. 26, 1974, Pat. No. 4,003,408. This application Jun. 25, 1976, Ser. No. 699,885
Int. Cl.[2] B29D *27/00;* B29H *1/10*
U.S. Cl. 264—41 3 Claims

1. A method of extruding porous irrigation pipe and the like comprising:

forming a mixture of granular elastomeric material having residual moisture therein and a plasticizable binder material,

feeding the mixture into and through an extruder to plasticize said binder material,

extruding said pipe from said extruder with said residual moisture being vaporized and with said binder material interlocking the granules of said elastomeric material to form labyrinth-type channel-like apertures in said pipe as said mixture is extruded, and

maintaining said elastomeric material in granular form during the extrusion of said pipe.

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## 4,110,421
## CATALYTIC PROCESS FOR THE PREPARATION OF PHOSPHAZENE POLYMERS

Ronald L. Dieck, and Alan B. Magnusson, both of Lancaster, Pa., assignors to Armstrong Cork Company, Lancaster, Pa.

Filed Oct. 12, 1976, Ser. No. 731,745
Int. Cl.[2] C01B *25/10*
U.S. Cl. 423—300 5 Claims

1. The process for preparing a phosphazene polymer which comprises heating a cyclic compound of the formula $(NPCl_2)_y$ where $y$ is 3, 4, or mixtures thereof at 140°–250° in an inert atmosphere with a catalytically sufficient amount of a compound having the formula $N_3P_3Cl_z(OR')_{6-z}$ wherein R' is $C_1$ to $C_{10}$ linear or branched alkyl, $C_1$ to $C_{10}$ substituted linear or branched alkyl, the substituent selected from the group consisting of halogen, nitro, $C_1$ to $C_{10}$ alkyl, $C_1$ to $C_{10}$ alkoxy, $C_6$ to $C_{10}$ aryl and $C_6$ to $C_{10}$ aryloxy radicals and $z$ equals 0 to 5.

## 4,110,422
## PRODUCTION OF STABILIZED WET PROCESS PHOSPHORIC ACID

Richard Newton Hill, Lakeland, Fla., assignor to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 683,756, May 6, 1976, abandoned. This application Jul. 1, 1977, Ser. No. 812,319
Int. Cl.[2] C01B *25/16*
U.S. Cl. 423—317 16 Claims

1. The method of preparing a wet process phosphoric acid substantially free from post-precipitation that includes the steps:

(a) to a wet process phosphoric acid having a $P_2O_5$ content of 22 to 35 weight percent from which the suspended solids have been removed, adding 0.05 to 2.0 weight percent of an aluminum silicate material based on the contained weight of $P_2O_5$ in the acid to provide an aluminum silicate material-acid mix; said aluminum silicate material being finely divided so as to be soluble in the phosphoric acid as the concentration of the acid is increased from 22–35 weight percent $P_2O_5$ to 42–52 weight percent $P_2O_5$;

(b) concentrating the aluminum silicate material-acid mix to said 42–52 weight percent $P_2O_5$ in an evaporation zone thereby to provide an aluminum silicate material/acid solution;

(c) transferring the concentrated solution to a crystallizing zone having an overflow stream and an underflow stream;

(d) recovering the overflow stream as wet-process phosphoric acid substantially free of post precipitation.

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## 4,110,423
## PRODUCTION OF CHLORINE AND AMMONIA

Roger Jean Botton, Saint-Fons, France, assignor to Societe RHONE-PROGIL, Paris, France

Continuation of Ser. No. 294,386, Oct. 2, 1972, abandoned. This application Feb. 14, 1975, Ser. No. 549,871
Claims priority, application France, Oct. 4, 1971, 71.35662
Int. Cl.[2] C01C *1/02*
U.S. Cl. 423—356 7 Claims

1. A solid reaction mass for the preparation of chlorine and ammonia by contact with ammonium chloride comprising iron oxide which is capable of chemically combining with chlorine during contact of the reaction mass with ammonium chloride and sodium chloride, with the ratio of the iron oxide and sodium chloride being such that the ratio of the chlorine chemically combined with the iron to the chlorine chemically combined with the sodium is less than 1.

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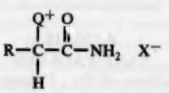
## 4,110,424
## PROCESS FOR THE PRODUCTION OF CYANIC ACID AND CARBOXAMIDES

Howard C. Haas, Arlington, Mass., and Robert D. Moreau, Nashua, N.H., assignors to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 627,373, Oct. 30, 1975, abandoned. This application Sep. 22, 1976, Ser. No. 725,571
Int. Cl.[2] C01B *21/12;* C01C *3/14;* C07D *211/00, 401/00*
U.S. Cl. 423—365 18 Claims

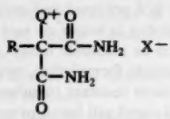
1. A process for producing cyanic acid and a carboxamide of the following structure




where R is selected from the group consisting of hydrogen and n-alkyl groups containing from one to twenty carbon atoms inclusive, Q is selected from the group consisting of tertiary aliphatic substituted ammonium groups, pyridinium, substituted pyridinium, quinolium, isoquinolinium and polymeric substituted pyridinium when R is hydrogen and from the

group consisting of pyridinium, substituted pyridinium, isoquinolinium, and polymeric substituted pyridinium groups when R is alkyl, and X is selected from the group consisting of bromide, chloride and iodide

which comprises heating a compound of the structure



at a temperature where cyanic acid is produced.

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4,110,425

## FORM RETAINING HYDROGEN-STORING MATERIAL

Horst Bühl, Weinstadt, and Susanne Will, Esslingen, both of Germany, assignors to Deutsche Automobilgesellschaft GmbH, Hanover, Germany

Filed Nov. 8, 1976, Ser. No. 740,069

Claims priority, application Fed. Rep. of Germany, Nov. 11, 1975, 2550584

Int. Cl.[2] C01B *1/32, 1/35*

U.S. Cl. 423—648 R 20 Claims

1. In a hydrogen-storing composition including hydrogen-storing material consisting of metals or alloys which are comminuted when used reversibly as a hydrogen-storing medium by alternating absorption and desorption with hydrogen gas, the improvement whereby the composition is made from retaining, wherein:

said hydrogen-storing material in the form of granules having a grain size of 5–200 microns is bound in a shaped form with a plastic having a desired adhesion or binding strength said plastic being present in an amount sufficient to bind said granules with sufficient strength without significantly affecting the hydrogen absorbing and desorbing properties thereof.

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4,110,426

## METHOD OF TREATING SKIN AND HAIR WITH A SELF-HEATED COSMETIC

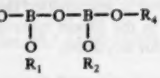
James Douglas Barnhurst, Millington, and Durland Karl Shumway, Piscataway, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation-in-part of Ser. No. 382,066, Jul. 24, 1973, abandoned, which is a continuation of Ser. No. 56,244, Jul. 17, 1970, abandoned, which is a continuation of Ser. No. 560,055, Jun. 24, 1966, abandoned. This application Mar. 4, 1976, Ser. No. 663,941

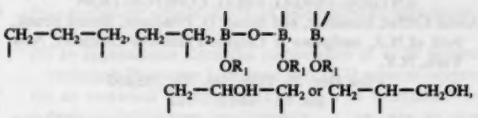
Int. Cl.[2] A61K *9/14, 7/15, 7/48*

U.S. Cl. 424—46 8 Claims

1. A method of treating skin and hair with a self-heated cosmetic composition devoid of any substance capable of reaction with the boron compound defined below and selected from the group consisting of skin cleaner, skin cream, skin lotion, shampoo, shaving preparation and after-shave preparation comprising contacting the skin and hair, in the presence of water, with said composition containing about 20 to about 80% by weight of a boron compound of the formula:



wherein $R_1$, $R_2$, $R_3$ and $R_4$ are individually $C_{2-8}$ alkyl, acetyl, mononuclear aryl, mononuclear aralkyl, mononuclear aroyl, cycloalkyl, or an ethoxylated derivative thereof, or $R_1$ and $R_3$ collectively or $R_2$ and $R_4$ collectively are:



to collectively form cyclic compounds.

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4,110,427

## POWDERED SOLID AEROSOL COMPOSITION AND METHOD OF MANUFACTURE

Edwin F. Kalat, Thomaston, Conn., assignor to The Risdon Manufacturing Company, Naugatuck, Conn.

Filed Apr. 14, 1976, Ser. No. 677,075

Int. Cl.[2] A61K *9/14*

U.S. Cl. 424—46 13 Claims

1. A water-based composition for carrying a powdered particulate solid, which is insoluble in both water and a carrier liquid, to be dispensed from a pressurized aerosol container as a spray, said composition comprising:

A. at least 20 percent water measured by the weight of the composition;

B. at least 15 percent powdered particulate solid, measured by the weight of the composition;

C. an anhydrous carrier liquid including a condensed aerosol hydrocarbon propellant gas that constitutes at most 50 percent of the composition measured by the weight thereof; and

D. an emulsifying agent for forming an emulsion of said water and said carrier liquid in which the powdered particulate solid particles are dispersed.

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4,110,428

## ANTIPERSPIRANT COMPOSITION

Johannes Andries Kuhn, Illovo Beach, and Randolph James Wilkinson, Durban North, both of Natal, South Africa, assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 525,267, Nov. 19, 1976, abandoned, which is a continuation-in-part of Ser. No. 124,453, Mar. 15, 1971, abandoned. This application Aug. 12, 1976, Ser. No. 713,775

Claims priority, application United Kingdom, Mar. 23, 1970, 13827/70

Int. Cl.[2] A61K *9/14, 7/32*

U.S. Cl. 424—46 1 Claim

1. In an antiperspirant composition comprising a suspension of from 0.1 to 10% by weight of a finely divided aluminium chlorhydrate in a solution containing isopropyl myristate and a halogenated hydrocarbon aerosol propellant selected from the group consisting of difluorodichloromethane, fluorotrichloromethane, tetrafluorodichloroethane, trifluorotrichloroethane and mixtures thereof, the improvement which comprises replacing the isopropyl myristate with a colorless, water- and propellant-miscible compound having the general formula

$$C_4H_9(OC_nH_{2n})_xOH$$

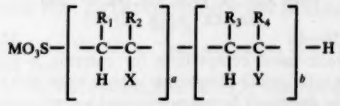
wherein $n$ is 2 or 3 and $x$ represents the number of moles of ethylene oxide and 1,2-propyleneoxide respectively such that the viscosity of the compound is from about 660 to about 3520 Saybolt Universal Seconds at 100° F, wherein the ratio of the colorless water- and propellant- miscible compound to the aluminium chlorhydrate is such that when the amount of the colorless water- and propellant- miscible compound is from about 2.5 to about 7.5% by weight, the amount of the aluminium chlorhydrate is about 3.5% by weight.

## 4,110,429
## ANTIBACTERIAL ORAL COMPOSITION

**Abdul Gaffar, Somerset, and Stuart D. Friedman, Bound Brook, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.**

**Filed Dec. 30, 1976, Ser. No. 755,895**
**Int. Cl.[2] A61K *17/22***
**U.S. Cl. 424—54** **16 Claims**

1. An oral composition comprising an oral vehicle, at least one nitrogen-containing antibacterial antiplaque agent, whose use has been observed to lead to staining or discoloration of dental surfaces, selected from the group consisting of cationic antibacterial antiplaque agent and long chain amine antibacterial antiplaque agent containing a fatty alkyl group of about 12 to 18 carbon atoms and as an anti-staining additive, present in a molar ratio, relative to said agent, of about 0.2:1 to about 6:1, of at least one water soluble oligomer of the formula



wherein

M is a water soluble orally acceptable cation;

$R_1$,$R_2$,$R_3$ and $R_4$ are independently H, methyl or ethyl;

Y is at least one hydrophilic member of the group consisting of $—COOM_1$, $—CONH_2$, and $—CH_2OH$;

X is at least one hydrophobic member of the group consisting of —CN, $—COOR_5OR$, —CONHR, —COONHR, COR, and —OOCR;

$M_1$ is H or M;

R is $C_{1-8}$ alkyl;

$R_5$ is $C_{1-4}$ alkylene;

*a* is 0–7; and

$a+b$ is about 4–15.

## 4,110,430
## A METHOD OF DEODORIZING

**Rudolf Hopp; Wolfgang Sturm, both of Holzminden, and Fritz Steinfatt, Opladen, all of Germany, assignors to Haarmann & Reimer GmbH, Holzminden, Germany**

**Filed Jan. 22, 1975, Ser. No. 543,201**
**Claims priority, application Fed. Rep. of Germany, Feb. 2, 1974, 2405004**
**Int. Cl.[2] A61K *7/32***
**U.S. Cl. 424—65** **5 Claims**

1. Method of deodorizing which comprises applying to the place to be deodorized an effective deodorising amount of a deodorising ingredient selected from the group consisting of p-isopropyl-α-methyl hydrocinnamic alcohol, p-tert. butyl-α-methyl hydrocinnamic alcohol and mixtures thereof.

## 4,110,431
## WET WEATHER RESISTANT BINDER COMPOSITION FOR ADHERING A PLANT TREATMENT ADDITIVE POWDER FORMULATION TO PLANT FOLIAGE

**Katashi Oita, Seattle, Wash., assignor to Weyerhaeuser Company, Tacoma, Wash.**

**Filed Nov. 12, 1976, Ser. No. 741,185**
**Int. Cl.[2] A01N *9/10***
**U.S. Cl. 424—78** **1 Claim**

1. A method for adhering an insoluble active formulation to plant surfaces comprising:

applying to said surfaces, being wetted by rainfall of less than one inch per hour, a uniformly mixed dry powder combination of an effective amount of the water-insoluble formulation and a binder composition, said binder comprising,

an inorganic metal salt that is water-soluble, selected from the group consisting of borax, chromic nitrate, cupric dichromate and cuprammonium hydroxide, and a polymer that is cold water-soluble having a cis diol structure selected from the group consisting of polyvinyl alcohol, quaternary ammonium derivative of guar gum and carboxymethylhydroxypropyl guar gum,

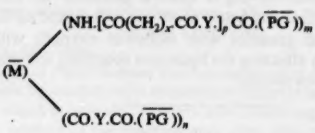
whereupon the cis diol polymer and metal salt components of the binder dissolve in water on said plant surfaces and then react to form an insoluble matrix of the binder composition and insoluble formulation, which matrix adheres to said plant surfaces resistant to subsequent rainfall, said polymer and said metal salt being present in an amount to form said insoluble matrix upon contact with water.

## 4,110,432
## CONJUGATES OF PROSTAGLANDINS, ANALOGS, FORMULATIONS AND THEIR USE

**Samuel Wilkinson, Beckenham; Roderick John Flower, London, both of England, and Sergio Henrique Ferreira, Sao Paulo, Brazil, assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.**

**Filed Jun. 3, 1975, Ser. No. 583,458**
**Claims priority, application United Kingdom, Jun. 4, 1974, 24660/74; Dec. 13, 1974, 53986/74**
**Int. Cl.[2] A61K *39/00, 31/215***
**U.S. Cl. 424—85** **22 Claims**

1. A conjugate of formula (I)



(I)

wherein (M) is that part of the macromolecule other than the reactive free amino group of an immunogenic macromolecule of the formula (M)—$NH_2$:

(PG) is the residue of a prostaglandin or analogue thereof of the formula (PG)-COOH selected from prostaglandins of the A, B, D and E series and those analogues thereof wherein there is retained the characteristic cyclopentane or cyclopentene group or wherein this group is replaced by a cyclohexane group;

Y is selected from

(i) $—NH(CH_2)_aNH—$ where *a* is 2 to 6;

(ii) $—NH(CH_2)_{b1}.Z.(CH_2)_{b2}.NH—$ where $_{b}1$ and $_{b}2$ are the same or different and each is 1 to 4 and Z is —O—, —NH— or —CH(OH)—;

(iii) $—W.CO.CH_2.W^1—$ where W and $W^1$ are the same or different and each is a group defined in (i) or (ii) above; or

(iv) $—NH.CH_2.CONH.CH_2.CO.W^2$ — where $W^2$ is a group defined in (i) or (ii) above;

*x* is 2 to 4;

*m* is at least 1 and is not greater than the number of free amino groups in the parent macromolecule of the group (M) available for acylation;

*p* is 1; and

*n* is 0 or an integer not greater than the number of carboxyl groups in the parent macromolecule of the group (M) available for reaction with the bis-amine H-Y-H;

and where, when the sum of m and n is greater than 1 the groups (PG) may be the same or different.

## 4,110,433
## EQUINE RHINOPNEUMONITIS VIRUS

**Charles W. Purdy, III, St. Joseph, Mo., assignor to Philips Roxane, Inc., St. Joseph, Mo.**

**Filed Apr. 23, 1976, Ser. No. 679,840**
**Int. Cl.[2] A61K** *39/12;* **C12K** *7/00*
**U.S. Cl. 424—89** **15 Claims**

1. A process for the production of an immunogenically active attenuated live equine rhinopneumonitis virus which comprises the steps of:

(a) introducing a live virulent equine rhinopneumonitis virus into a Vero cell culture;
(b) incubating the culture until the cellular cytopathology becomes evident;
(c) harvesting a portion of the virus so produced and reintroducing the harvested virus into fresh tissue cultures;
(d) repeating serial passage of the virus in tissue culture a sufficient number of times at a temperature within the range of from about 23° to about 33° C; to produce an immunogenically active live avirulent virus; and
(e) recovering said virus from said tissue culture medium.

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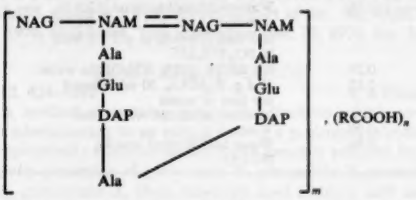
## 4,110,434
## NOVEL IMMUNOLOGICAL ADJUVANTS, PROCESS FOR THEIR PRODUCTION AND COMPOSITIONS CONTAINING THEM

**Pierre Jolles, Paris, and Daniéle Migliore-Samour, Kremlin-Bicetre, both of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly sur Seine, France**

**Filed Aug. 3, 1976, Ser. No. 711,193**
**Claims priority, application France, Aug. 5, 1975, 75 24440**
**Int. Cl.[2] A61K** *39/02;* **C07C** *103/52;* **A61K** *37/00*
**U.S. Cl. 424—92** **18 Claims**

1. A novel derivative with immunological adjuvant activity obtained from hydrosoluble extracts of mycobacteria, with or without non-amino reducing sugars associated therewith, said derivative having the formula:




in which *m* is a whole number between 1 and 4 inclusive, *n* is a whole number at least 1 and R is an alkyl radical containing 9 to 17 carbon atoms.

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## 4,110,435
## ANTIBIOTIC A-28086 FACTOR D AND PROCESS FOR PRODUCTION THEREOF

**Walter M. Nakatsukasa, Indianapolis, and Robert L. Hamill, Greenwood, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Continuation-in-part of Ser. No. 661,185, Feb. 25, 1976, abandoned, which is a continuation of Ser. No. 569,719, Apr. 21, 1975, abandoned. This application Jan. 26, 1977, Ser. No. 762,535**
**Int. Cl.[2] A61K** *35/00*
**U.S. Cl. 424—122** **5 Claims**

1. A compound selected from the group consisting of (1) antibiotic A-28086 factor D which is a white crystalline compound when crystallized from acetone-water; which is soluble in methanol, ethanol, dimethylformamide, dimethyl sulfoxide, ethyl acetate, chloroform, acetone and benzene; but which is only slightly soluble in hexane; and which is insoluble in water; which melts at about 96°–98° C., and which has:

(a) a molecular weight of 778, as determined by high-resolution mass spectrometry;
(b) an approximate elemental composition of 67.59 percent carbon; 9.38 percent hydrogen, and 22.77 percent oxygen;
(c) an empirical formula of $C_{44}H_{74}O_{11}$, as determined by high-resolution mass spectrometry;
(d) a specific rotation of −56° (c = 0.1, methanol) when determined at 25° C;
(e) an infrared absorption spectrum in chloroform with the following observable absorption maxima: 2.89, 3.39, 3.43, 3.50, 5.88 6.90, 7.27, 7.60, 7.84, 9.00, 9.26, 9.62, 10.31, 10,58, 11.10, and 11.49 microns;
(f) no observable ultraviolet absorption in 95 percent aqueous ethanol;
(g) a nuclear magnetic resonance spectrum in chloroform with the following characteristics: δ 6.00, 4.20, 4.10, 4.00, 3.98, 3.92, 3.86, 3.83, 3.79, 3.67, 3.64, 3.57, 3.54, 2.88, 2.81, 2.71, 2.62, 2.58, 2.48, 2.43, 2.37, 2.29, 2.21, 2.15, 2.10, 2.04, 1.97, 1.89, 1.83, 1.76, 1.68, 1.61, 1.58, 1.55, 1.47, 1.39, 1.30, 1.25, 1.18, 0.95, 0.90, 0.88, 0.84, 0.74, and 0.68 ppm;
(h) a titratable group with a $pK_a$ value of 8.67 in 80% aqueous dimethylformamide;
(i) a characterisitic X-ray powder-diffraction pattern ($Cu^{++}$ radiation, 1.5405 λ, nickel filter) having the following interplanar spacing in angstroms (d):

| d | Relative Intensity |
|---|---|
| 12.40 | 100 |
| 10.20 | 70 |
| 8.85 | 90 |
| 7.80 | 30 |
| 6.80 | 10 |
| 6.30 | 100 |
| 5.70 | 20 |
| 5.35 | 20 |
| 5.10 | 20 |
| 4.90 | 10 |
| 4.65 | 20 |
| 4.45 | 40 |
| 4.20 | 30 |
| 3.30 | 10 |
| 3.15 | 10 |
| 2.99 | 05 |
| 2.77 | 05 |
| 2.28 | 05 |

(j) the following $R_f$ values in the silica-gel thin-layer chromatographic systems indicated below, using Bacillus subtilis ATCC 6633 as a detection organism:

| $R_f$ Value | Solvent System |
|---|---|
| 0.26 | Benzene-ethyl acetate (3:2) |
| 0.66 | Ethyl acetate-diethylamine (95:5) |

(k) the following $R_f$ values in the paper chromatographic systems indicated below, using Bacillus subtilis ATCC 6633 as a detection organism:

| $R_f$ Value | Solvent System |
|---|---|
| 0.10 | Water saturated with methyl isobutyl ketone (MIBK) |
| 0.26 | Water saturated with MIBK plus 2% p-toluenesulfonic acid and 1% piperidine |
| 0.36 | Water:methanol:acetone (12:3:1)-adjusted to pH 10.5 with $NH_4OH$ and then lowered to pH 7.5 with $H_3PO_4$ |
| 0.29 | 1% MIBK, 0.5% $NH_4OH$ in water |
| 0.25 | 17.4 g. $K_2HPO_4$, 30 ml. ethanol per liter of water |
| 0.26 | Benzene saturated with water |
| 0.09 | Water |
| 0.64 | Water:MIBK:ethyl acetate |

-continued

| $R_f$ Value | Solvent System |
|---|---|
| | (98:1:1) |

(l) an acid function capable of forming salts and ester derivatives; and

(m) at least one hydroxyl group capable of esterification;

(2) the acetyl ester derivative of A-28086 factor D, which has a molecular weight of about 820, as determined by electron-impact mass spectrometry, an empirical formula of $C_{46}H_{76}O_{12}$, an elemental composition of approximately 67.32 percent carbon, 9.27 percent hydrogen, and 23.41 percent oxygen, an approximate $R_f$ value of 0.54 on silica-gel thin-layer chromatography in ethyl acetate, and an infrared absorption spectrum as shown in FIG. 2 of the drawings; (3) the n-butyryl ester derivative of A-28086 factor D which has a molecular weight of about 848, as determined by electron-impact mass spectrometry, an empirical formula of $C_{48}H_{80}O_{12}$, an elemental composition of approximately 67.93 percent carbon, 9.43 percent hydrogen, and 22.44 percent oxygen, an approximately $R_f$ value of 0.61 on silica-gel thin-layer chromatography in ethyl acetate, and an infrared absorption spectrum as shown in FIG. 3 of the drawings; (4) the physiologically-acceptable salts of A-28086 factor D; and (5) the physiologically-acceptable salts of the acetyl and n-butyryl ester derivatives of A-28086 factor D.

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**4,110,436**

## ANTIBIOTIC A-28086 FACTOR D AND PROCESS FOR PRODUCTION THEREOF

**Walter M. Nakatsukasa, Indianapolis, and Robert L. Hamill, Greenwood, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Continuation-in-part of Ser. No. 657,423, Feb. 12, 1976, abandoned, which is a division of Ser. No. 569,719, Apr. 21, 1975, abandoned. This application Jan. 26, 1977, Ser. No. 762,536**

**Int. Cl.**[2] **A61K** *35/00*

**U.S. Cl. 424—122** **10 Claims**

1. A method of preventing or treating coccidiosis in poultry which comprises administering to poultry an effective anticoccidial amount of a composition comprising: (1) a compound selected from the group consisting of antibiotic A-28086 factor D which is a white crystalline compound when crystallized from acetone-water; which is soluble in methanol, ethanol, dimethylformamide, dimethyl sulfoxide, ethyl acetate, chloroform, acetone and benzene; but which is only slightly soluble in hexane; and which is insoluble in water; which melts at about 96°–98° C., and which has:

(a) a molecular weight of 778, as determined by high-resolution mass spectrometry;

(b) an approximate elemental composition of 67.59 percent carbon; 9.38 percent hydrogen, and 22.77 percent oxygen;

(c) an empirical formula of $C_{44}H_{74}O_{11}$, as determined by high-resolution mass spectrometry;

(d) a specific rotation of $-56°$ ($c$ = 0.1, methanol) when determined at 25° C.;

(e) an infrared absorption spectrum in chloroform with the following observable absorption maxima: 2.89, 3.39, 3.43, 3.50, 5.88, 6.90, 7.27, 7.60, 7.84, 9.00, 9.26, 9.62, 10.31, 10.58, 11.10, and 11.49 microns;

(f) no observable ultraviolet absorption in 95 percent aqueous ethanol;

(g) a nuclear magnetic resonance spectrum in chloroform with the following characteristics: $\delta$ 6.00, 4.20, 4.10, 4.00, 3.98, 3.92, 3.86, 3.83, 3.79, 3.67, 3.64, 3.57, 3.54, 2.88, 2.81, 2.71, 2.62, 2.58, 2.48, 2.43, 2.37, 2.29, 2.21, 2.15, 2.10, 2.04, 1.97, 1.89, 1.83, 1.76, 1.68, 1.61, 1.58, 1.55, 1.47, 1.39, 1.30, 1.25, 1.18, 0.95, 0.90, 0.88, 0.84, 0.74, and 0.68 ppm;

(h) a titratable group with a $pK_a$ value of 8.67 in 80% aqueous dimethylformamide;

(i) a characteristic X-ray powder-diffraction pattern ($Cu^{++}$ radiation, 1.5405 λ, nickel filter) having the following interplanar spacings in angstroms (d):

| d | Relative Intensity |
|---|---|
| 12.40 | 100 |
| 10.20 | 70 |
| 8.85 | 90 |
| 7.80 | 30 |
| 6.80 | 10 |
| 6.30 | 100 |
| 5.70 | 20 |
| 5.35 | 20 |
| 5.10 | 20 |
| 4.90 | 10 |
| 4.65 | 20 |
| 4.45 | 40 |
| 4.20 | 30 |
| 3.30 | 10 |
| 3.15 | 10 |
| 2.99 | 05 |
| 2.77 | 05 |
| 2.28 | 05 |

(j) the following $R_f$ values in the silica-gel thin-layer chromatographic systems indicated below, using *Bacillus subtilis* ATCC 6633 as a detection organism:

| $R_f$ Value | Solvent System |
|---|---|
| 0.26 | Benzene-ethyl acetate (3:2) |
| 0.66 | Ethyl acetate-diethylamine (95:5) |

(k) the following $R_f$ values in the paper chromatographic systems indicated below, using *Bacillus subtilis* ATCC 6633 as a detection organism:

| $R_f$ Value | Solvent System |
|---|---|
| 0.10 | Water saturated with methyl isobutyl ketone (MIBK) |
| 0.26 | Water saturated with MIBK plus 2% p-toluenesulfonic acid and 1% piperidine |
| 0.36 | Water:methanol:acetone (12:3:1)-adjusted to pH 10.5 with $NH_4OH$ and then lowered to pH 7.5 with $H_3PO_4$ |
| 0.29 | 1% MIBK, 0.5% $NH_4OH$ in water |
| 0.25 | 17.4 g. $K_2HPO_4$, 30 ml. ethanol per liter of water |
| 0.26 | Benzene saturated with water |
| 0.09 | Water |
| 0.64 | Water:MIBK:ethyl acetate (98:1:1) |

(l) an acid function capable of forming salts and ester derivatives; and

(m) at least one hydroxyl group capable of esterification;

the acetyl ester derivative of A-28086 factor D which has a molecular weight of about 820, as determined by electron-impact mass spectrometry, an empirical formula of $C_{46}H_{76}O_{12}$, an elemental composition of approximately 67.32 percent carbon, 9.27 percent hydrogen, and 23.41 percent oxygen, an approximate $R_f$ value of 0.54 on silica-gel thin-layer chromatography in ethyl acetate, and an infrared absorption spectrum as shown in FIG. 2 of the drawings; the n-butyryl ester derivative of A-28086 factor D which has a molecular weight of about 848, as determined by electron-impact mass spectrometry, an empirical formula of $C_{48}H_{80}O_{12}$, an elemental composition of approximately 67.93 percent carbon, 9.43 percent hydrogen, and 22.44 percent oxygen, an approximate $R_f$ value of 0.61 on silica-gel thin-layer chromatography in ethyl acetate, and an infrared absorption spectrum as shown in FIG. 3 of the drawings; the physiologically-acceptable salts of A-28086 factor D; and the physiologically-acceptable salts of the acetyl and n-butyryl ester derivatives of A-28086 factor D; and (2) a physiologically-acceptable carrier.

4,110,437

## METHOD OF TREATING CANCEROUS CACHEXIA IN HUMANS WITH HYDRAZINE SULFATE

Joseph Gold, 127 Edgemont Dr., Syracuse, N.Y. 13214

Continuation-in-part of Ser. No. 558,255, Mar. 14, 1975, abandoned, which is a continuation of Ser. No. 413,036, Nov. 5, 1973, abandoned, which is a division of Ser. No. 372,097, Jun. 21, 1973, abandoned, which is a continuation-in-part of Ser. No. 198,995, Sep. 15, 1971, abandoned, which is a continuation-in-part of Ser. No. 861,176, Sep. 25, 1969, abandoned. This application Feb. 3, 1977, Ser. No. 765,362

Int. Cl.[2] A61K *33/02*

U.S. Cl. 424—166 6 Claims

1. A method of retarding and reducing cancerous cachexia in a human so afflicted which comprises internally administering to said human hydrazine sulfate in an effective dosage sufficient to retard and reduce the cachexia and continuing its use in the absence of tumor reduction.

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4,110,438

## METHOD OF TREATING DEPRESSION

Max Gahwyler, Darien, Conn., assignor to American Home Products Corporation, New York, N.Y.

Filed Mar. 21, 1977, Ser. No. 779,373

Int. Cl.[2] A61K *37/00;* C07C *103/52*

U.S. Cl. 424—177 5 Claims

1. A method of treating a patient suffering from stress induced depression comprising administering to said patient a therapeutically effective amount of luteinizing hormone-releasing hormone, or a therapeutically acceptable salt thereof.

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4,110,439

## AMINO GLYCOSIDE ANTIBIOTICS HAVING ANTIPROTOZOAL ACTIVITY

David J. Cooper, Downingtown, Pa.; Jay Allan Waitz, Fairfield, N.J.; Mae Counelis, New York, N.Y., and Jay Weinstein, Bloomfield, N.J., assignors to Schering Corporation, Kenilworth, N.J.

Division of Ser. No. 618,647, Oct. 1, 1975, Pat. No. 4,049,796, which is a division of Ser. No. 389,774, Aug. 20, 1973, Pat. No. 3,915,955, which is a continuation-in-part of Ser. No. 48,017, Jun., 1970, abandoned. This application Dec. 20, 1976, Ser. No. 752,375

Int. Cl.[2] A61K *31/71, 31/70*

U.S. Cl. 424—181 6 Claims

1. A method of treating protozoal infections which comprises administering to an animal having a protozoal infection a therapeutically effective quantity of a member selected from the group consisting of gentamicin A, gentamicin B, gentamicin $B_1$, gentamicin X, their non-toxic acid addition salts and mixtures thereof.

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4,110,440

## PESTICIDAL ORGANOPHOSPHORIC ACID ESTER ANHYDRIDES

Junichi Saito, Tokyo; Akio Kudamatsu, Kanagawa; Toyohiko Kume, Tokyo; Kozo Shiokawa, Kanagawa, and Shinichi Tsuboi, Tokyo, all of Japan, assignors to Nihon Tokushu Noyaku Seizo K.K., Tokyo, Japan

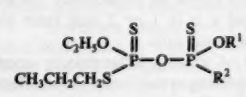
Filed Nov. 3, 1977, Ser. No. 848,415

Claims priority, application Japan, Nov. 5, 1976, 51/132478

Int. Cl.[2] A01N *9/36;* C07F *9/165*

U.S. Cl. 424—207 11 Claims

1. An organophosphoric acid ester anhydride of the formula



in which

$R^1$ is alkyl with 1–6 carbon atoms, and

$R^2$ is alkoxy, alkylthio, alkylamino or dialkylamino.

2. A method of combating arthropods or nematodes, or to a habitat thereof, an arthropodicidally or nematicidally effective amount of a compound according to claim 1.

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4,110,441

## GAMMA-L-GLUTAMYL CHOLAMINE PHOSPHATE

Laszlo Feuer; Arpad Furka; Ferenc Sebestyen; Jolan Hercsel nee Szepespataky, and Erzsebet Bendefy nee Dobay, all of Budapest, Hungary, assignors to Chinoin Gyogyszer es Vegyeszeti Termekek Gyara Rt., Budapest, Hungary

Continuation-in-part of Ser. No. 571,766, Apr. 25, 1975, abandoned. This application Jun. 16, 1976, Ser. No. 696,762

Claims priority, application Hungary, Apr. 29, 1974, FE 928; Mar. 26, 1975, CI 1558

Int. Cl.[2] A01N *9/36;* C07F *9/09*

U.S. Cl. 424—211 6 Claims

1. A method of reducing the blood-sugar level and increasing the serum vitamin A level which comprises administering an effective amount of gamma-L-glutamyl cholamine phosphate.

3. A compound selected from the group which consists of gamma-L-glutamyl cholamine phosphate, beta-aspartyl cholamine phosphate and pharmaceutically effective salts thereof.

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4,110,442

## 2-PHOSPHONOXY-4-TRIFLUOROMETHYLBENZOIC ACID DERIVATIVES AND PHARMACEUTICAL COMPOSITIONS CONTAINING SAME

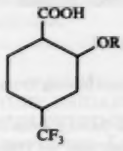
Emilia Francia Barra, and Antonio Carmelo Marin Moga, both of Barcelona, Spain, assignors to J. Uriach & Cia S.A., Barcelona, Spain

Division of Ser. No. 694,523, Jun. 10, 1976. This application Dec. 30, 1976, Ser. No. 755,851

Int. Cl.[2] A01N *9/36;* C07F *9/09*

U.S. Cl. 424—212 5 Claims

1. The compound of the formula



in which R is phosphonoxy, and pharmaceutically acceptable salts thereof.

2. The method for the treatment and prophylaxis of a cardiovascular condition due to platelet aggregation, coagulation and fibrinolysis, the said method comprising the by oral administration per day of 200-300 mg of the effective agent of claim 1.

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4,110,443

## INSECTICIDAL O,S-DIHYDROCARBYL-N-HALOACYLPHOSPHOROAMIDOTHIOATES AND S,S-DIHYDROCARBYL-N-HALOACYLPHOSPHOROAMIDODITHIOATES

Philip S. Magee, Ignacio, Calif., assignor to Chevron Research Company, San Francisco, Calif.

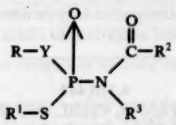
Division of Ser. No. 317,316, Dec. 21, 1972, Pat. No. 4,049,679, which is a continuation-in-part of Ser. No. 13,846, Feb. 24, 1972, Pat. No. 3,716,600, which is a continuation-in-part of Ser. No. 810,383, Mar. 25, 1969, abandoned. This application Jun. 10, 1977, Ser. No. 805,494

Int. Cl.[2] A01N *9/36*

U.S. Cl. 424—212 16 Claims

1. A method for killing insects which comprises applying to

said insects an insecticidal amount of the compound of the formula



wherein R and $R^1$ individually are alkyl, alkenyl or alkynyl of up to 6 carbon atoms and $R^2$ is haloalkyl of 1 to 18 carbon atoms and of 1 to 4 fluorine, chlorine or bromine atoms, $R^3$ is hydrogen or alkyl of 1 to carbon atoms and Y is oxygen or sulfur.

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**4,110,444**

## THIOCARBAMATES

**Hewitt G. Wight; Tracey G. Call, both of San Luis Obispo, and Marvin L. Mortensen, Altascadero, all of Calif., assignors to The California Polytechnic State University Foundation, San Luis Obispo, Calif.**

**Continuation-in-part of Ser. No. 579,449, May 21, 1975, abandoned. This application Feb. 28, 1977, Ser. No. 773,064**

**Int. Cl.[2] A61K** *31/655;* **C09B** *25/00*

**U.S. Cl. 424—226** **34 Claims**

1. A thiocarbamate of the formula: RNHCXSR'COOR" wherein

R is paraphenylazophenyl,

X is oxygen

R' is an alkylene radical, and

R" is hydrogen or an alkyl radical.

29. A method for increasing the resistance of erythrocytes in a mammal to hemolysis, which comprises:

systemically administering to said mammal an amount of a thiocarbamate of the formula: RNHCXSR'COOR" wherein

R is paraphenylazophenyl,

X is oxygen,

R' is an alkylene radical having from 1 to about 5 carbon atoms, and

R" is an alkyl radical having from 1 to about 10 carbon atoms, effective to increase the resistance of erythrocytes in said mammal to hemolysis.

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**4,110,445**

## METHOD FOR ANTAGONIZING ALDOSTERONIC ACTION AND INDUCING DIURESIS BY ADMINISTERING A TETRASUBSTITUTED IMIDAZOLIDINE

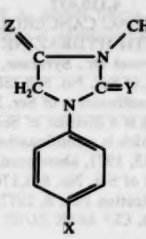
**John William Hanifin, Jr.; Robert Zalmon Gussin, both of Suffern, and Elliott Cohen, Pearl River, all of N.Y., assignors to American Cyanamid Company, Stamford, Conn.**

**Division of Ser. No. 293,874, Oct. 2, 1972, Pat. No. 4,044,021, which is a continuation-in-part of Ser. No. 191,470, Oct. 21, 1971, abandoned. This application Apr. 20, 1977, Ser. No. 789,034**

**Int. Cl.[2] A61K** *31/415*

**U.S. Cl. 424—229** **9 Claims**

1. A method for antagonizing renal aldosteronic action and inducing diuresis in mammals by administering internally to said mammals an effective amount of a tetrasubstituted imidazolidine of the formula:



wherein X is selected from the group consisting of hydrogen and chlorine; Y and Z are each selected from the group consisting of NH, $NCH_3$ and O, with the proviso that both Y and Z are not O in the same compound; and the pharmaceutically acceptable salts thereof.

2. The method according to claim 1 wherein the tetrasubstituted imidazolidine is 1-(p-chlorophenyl)-2-imino-3-methyl-4-oxoimidazolidine.

9. The method according to claim 2 wherein said tetrasubstituted imidazolidine is administered in combination with another diuretic agent selected from the group consisting of bumetanide, thiazides, ethacrynic acid, furosemide and quinethazone.

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**4,110,446**

## METHOD OF TREATING MILK FEVER IN DAIRY CATTLE WITH 1,25-DIHYDROXYCHOLECALCIFEROL

**Hector F. DeLuca, Madison, and Neal A. Jorgensen, Middleton, both of Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.**

**Filed Jul. 14, 1977, Ser. No. 815,587**

**Int. Cl.[2] A61K** *31/59*

**U.S. Cl. 424—236** **6 Claims**

1. The method of treatment and prophylaxsis for milk fever disease in cattle which comprises administering to the cattle 1,25-dihydroxycholecalciferol in an amount sufficient to induce said treatment and prophylaxsis.

6. The method of treatment and prophylaxis for downer cow syndrome in cattle which comprises administering to the cattle 1,25-dihydroxycholecalciferol in an amount sufficient to induce said treatment and prophylaxis.

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**4,110,447**

## ANTI-INFLAMMATORY (HOLO-4-BIPHENYLYL)-ALKANOLAMINES

**Joachim Gante; Hans-Adolf Kurmeier; Erich Schacht; Werner Mehrhof; Dieter Orth; Albrecht Wild, and Zdenek Simane, all of Darmstadt, Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit beschraenkter Haftung, Darmstadt, Fed. Rep. of Germany**

**Filed Oct. 22, 1975, Ser. No. 624,762**

**Claims priority, application Fed. Rep. of Germany, Oct. 26, 1974, 2450989; May 28, 1975, 2523565**

**Int. Cl.[2] C07D** *295/08;* **C07C** *91/06*

**U.S. Cl. 424—244** **17 Claims**

1. An araliphatic nitrogen compound of the formula

$$R—C(OH)(CH_3)—CH_2—(CH_2)_n—Z$$

wherein R is 4-biphenylyl monosubstituted or polysubstituted by F, Cl and/or Br; Z is $—NR^1R^2$, $R^1$ and $R^2$ each are H or alkyl of 1–6 carbon atoms, or, collectively, are alkylene of 4–7 carbon atoms; and *n* is 0, 1 or 2, and their physiologically acceptable acid addition salts.

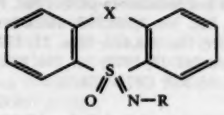
15. A method of treating inflammatory conditions which comprises administering systemically to the affected patient an anti-inflammatorily effective amount of a compound of claim 1.

## 4,110,448
## TRICYCLIC SULPHOXIMIDES IN PHARMACEUTICAL COMPOSITIONS AND METHODS

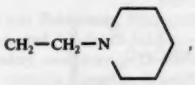
Peter Stoss, Wildtal; Gerhard Satzinger, Denzlingen, and Manfred Herrmann, St. Peter, all of Fed. Rep. of Germany, assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 496,618, Aug. 12, 1974, Pat. No. 3,992,376.
This application Aug. 31, 1976, Ser. No. 719,317
Claims priority, application Fed. Rep. of Germany, Apr. 8, 1974, 2417063
Int. Cl.[2] A61K *31/54, 31/38, 31/39, 31/385*
U.S. Cl. 424—247 12 Claims

1. A pharmaceutical composition for producing an anti-histaminic, anti-tussive, anti-inflammatory sedative, or diuretic effect in a mammal comprising a pharmaceutical carrier and a pharmaceutically effective amount sufficient for producing an anti-histaminic, anti-tussive, anti-inflammatory sedative or diuretic effect in a mammal of a tricyclic sulphoximide or pharmaceutical salt thereof of the formula:



wherein X is
N—$CH_3$,
N—CO—$CH_3$, or
N—H;
wherein R is
$CH_2$—$CH_2$—$N(C_2H_5)_2$,
$CH_2$—$CH_2$—$CH_2$—$N(CH_3)_2$,



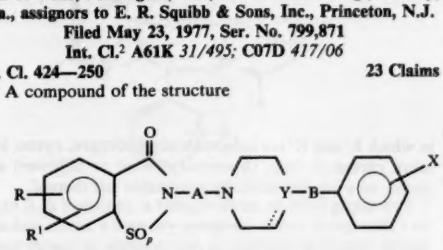
CO—$CH_2$—$CH_2$—$N(C_2H_5)_2$,
CO—O—$C_2H_5$,
CO—NH—$C_6H_{11}$,
CS—NH—$CH_2$—CH=$CH_2$, or
CO—NH—$SO_2$—$C_6H_4CH_3$(p)

## 4,110,449
## 2-SUBSTITUTED BENZISOTHIAZOL-3-ONES

Peter C. Wade, Pennington, N.J., and B. Richard Vogt, Yardley, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed May 23, 1977, Ser. No. 799,871
Int. Cl.[2] A61K *31/495;* C07D *417/06*
U.S. Cl. 424—250 23 Claims

1. A compound of the structure



wherein R is hydrogen, halogen, lower alkyl, lower alkoxy, or nitro; $R^1$ is hydrogen, lower alkoxy or halogen, with the proviso that $R^1$ can be lower alkoxy or halogen only when R is lower alkoxy or halogen, respectively; X is hydrogen, halogen, lower alkyl, lower alkoxy, or trifluoromethyl; Y is C or N, where Y is C, represents a double bond, and when Y is N, represents a single bond, A is an alkylene group containing 2 to 5 carbons; and B is a single bond or an alkylene group containing from 1 to 3 carbons, and physiologically acceptable acid-addition salts thereof.

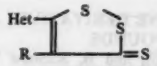
18. A composition which comprises a compound of claim 1 in a physiologically acceptable vehicle, said compound being present in an effective amount for treating an inflammatory condition.

## 4,110,450
## 1,2-DITHIOLE DERIVATIVES

Michel Barreau; Claude Cotrel, both of Paris, and Claude Jeanmart, Brunoy, all of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed Feb. 9, 1977, Ser. No. 766,966
Claims priority, application France, Feb. 10, 1976, 76 03604; Dec. 23, 1976, 76 38901
Int. Cl.[2] A61K *31/495, 31/50, 31/505;* C07D *241/02*
U.S. Cl. 424—250 7 Claims

1. A 1,2-dithiole derivative of the formula:



wherein Het represents a pyrazin-2-yl radical, or a said pyrazin-2-yl radical substituted by a halogen atom, an alkyl radical of 1 through 4 carbon atoms, an alkoxy radical of 1 though 4 carbon atoms, the mercapto radical, an alkylthio radical of 1 through 4 carbon atoms, a dialkylamino group having 1 through 4 carbon atoms in each alkyl radical, or a pyrrolidin-1-yl, piperidino or morpholino radical, and R represents a halogen atom or an alkyl radical of 1 through 4 carbon atoms, an alkyl radical of 1 through 4 carbon atoms substituted by an alkoxycarbonyl group having 1 through 4 carbon atoms in the alkoxy radical, the carboxy radical, an alkoxycarbonyl group having 1 through 4 carbon atoms in the alkoxy radical, the carbamoyl radical, an N-alkylcarbamoyl group having 1 through 4 carbon atoms in the alkyl radical, or a group $R_1$-CH(OH)— in which $R_1$ represents hydrogen or an alkyl radical of 1 through 3 carbon atoms.

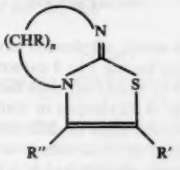
7. An antibiharzia pharmaceutical composition which comprises a 1,2-dithiole derivative as claimed in claim 1 in association with one or more compatible and pharmaceutically acceptable diluents or adjuvants.

## 4,110,451
## ANTIINFLAMMATORY IMIDAZOTHIAZOLES AND THIAZOLOPYRIMIDINES

Robert E. Moser, Mentor; Larry J. Powers, Madison, and Zaven S. Ariyan, Mentor, all of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Division of Ser. No. 650,318, Jan. 19, 1976, Pat. No. 4,041,167.
This application Dec. 29, 1976, Ser. No. 755,276
Int. Cl.[2] A61K *31/425, 31/505*
U.S. Cl. 424—251 7 Claims

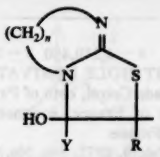
1. A method of treating inflammation in an animal subject comprising administering to said subject a nontoxic antiinflammatory amount of a compound of the formula:



wherein *n* is 3; R is hydrogen or methyl; R′ is hydrogen, $C_1$–$C_3$ alkyl or thioalkyl, phenyl, or carboxy methyl; and R″ is $C_1$–$C_4$ alkyl, 2-benzofuranyl, naphthyl, phenyl, or mono- or disubstituted phenyl, or an acid addition or quaternary salt thereof.

5. A method of treating inflammation in an animal subject

comprising administering to said subject a nontoxic antiinflammatory amount of a compound of the formula:



wherein *n* is 3; R is hydrogen or methyl; and Y is phenyl or p-chloro- or p-methoxyphenyl, or an acid addition or quaternary salt thereof.

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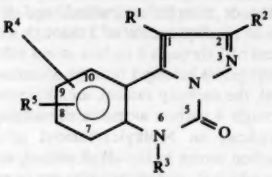
**4,110,452**

**PYRAZOLO (1,5-C) QUINAZOLINE DERIVATIVES AND RELATED COMPOUNDS**

**George C. Rovnyak, Hopewell, N.J., and B. Richard Vogt, Yardley, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Filed Oct. 17, 1977, Ser. No. 842,776**
**Int. Cl.[2] C07D *487/04;* A61K *31/415, 31/505***
**U.S. Cl. 424—251** **13 Claims**

1. Compounds of the structure



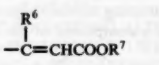
wherein

$R^1$ is alkylamino, dialkylamino, or

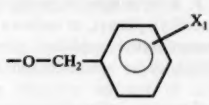
$R^2$ is alkylamino, dialkylamino, or

the alkyl moiety in the above $R^1$ and $R^2$ groups having from 1 to 8 carbons;

$R^3$ is hydrogen, lower alkyl, benzyl, phenyl or phenyl substituted by a single $R^8$ radical,



(wherein $R^6$ is amino, alkylamino having 1 to 4 carbons, or dialkylamino having 1 to 4 carbons in each alkyl, and $R^7$ is alkyl of 1 to 4 carbons), with the proviso that at least one of $R^1$ or $R^2$ is alkylamino or dialkylamino; p1 $R^4$, $R^5$ and $R^8$ may be the same or different and are hydrogen, lower alkyl of 1 to 4 carbons, lower alkoxy of 1 to 4 carbons, hydroxy, alkanoyloxy of 2 to 5 carbons,



(wherein $X_1$ is hydrogen, lower alkoxy of 1 to 4 carbons), hydroxy, Cl, F, Br, $CF_3$ or $NO_2$,

and physiologically acceptable salts thereof.

13. A method for treating allergic conditions in mammals, which comprises administering to the mammalian host a therapeutic amount of a compound as defined in claim 1.

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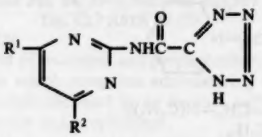
**4,110,453**

**N-(2-PYRIMIDINYL)1H-(OR 2H)TETRAZOLE-5-CARBOXAMIDE DERIVATIVES FOR THE PREVENTION OF IMMEDIATE TYPE HYPERSENSITIVITY REACTIONS**

**John H. Sellstedt, Pottstown; Charles J. Guinosso, King of Prussia, both of Pa., and Albert J. Begany, Tucson, Ariz., assignors to American Home Products Corporation, New York, N.Y.**

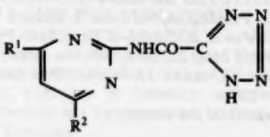
**Continuation-in-part of Ser. No. 669,562, Mar. 23, 1976, Pat. No. 4,044,144, which is a continuation-in-part of Ser. No. 542,465, Jan. 20, 1975, Pat. No. 3,966,965, which is a continuation-in-part of Ser. No. 344,466, Mar. 23, 1973, abandoned. This application Jul. 15, 1977, Ser. No. 815,973**
**Int. Cl.[2] A61K *31/505;* C07D *403/02***
**U.S. Cl. 424—251** **6 Claims**

1. A process for preventing the release of pharmacological mediators from an immediate hypersensitivity reaction between reaginic type antibodies and an antigen, thereby preventing the symptoms manifest in bronchial asthma, seasonal pollinosis, allergic rhinitis, urticaria, allergic conjunctivitis, food allergy and anaphylactoid reactions of a sensitized animal, which comprises prophylactically administering to said animal an effective amount of a compound of the formula:



in which $R^1$ and $R^2$ are independently hydrogen, cyano, lower alkyl, carbamyl, halo, (lower) alkylamino or di(lower) alkylamino, or a pharmaceutically acceptable salt thereof.

3. A compound of the formula:



in which $R^1$ and $R^2$ are independently hydrogen, cyano, lower alkyl, carbamyl, halo, (lower)alkylamino or di(lower) alkylamino, or a pharmaceutically acceptable salt thereof.

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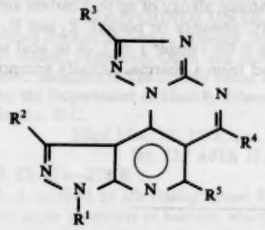
**4,110,454**

**8H-PYRAZOLO[4',3':5,6]PYRIDO [3,4-E][1,2,4]TRIAZOLO-[1,5-A]PYRIMIDINES**

**Theodor Denzel, Regensburg, and Hans Hoehn, Tegernheim, both of Fed. Rep. of Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Division of Ser. No. 715,599, Aug. 18, 1976, Pat. No. 4,078,064. This application Jan. 9, 1978, Ser. No. 867,740**
**Int. Cl.[2] A61K *31/415;* C07D *471/22***
**U.S. Cl. 424—251** **13 Claims**

1. A compound of the formula



wherein $R^1$ is hydrogen, lower alkyl, phenyl, phenyl-lower alkylene, benzoyl or substituted benzoyl wherein the benzoyl substituent is one or two halogens, lower alkyl or trifluoromethyl groups;

$R^2$ is hydrogen, lower alkyl or phenyl;

$R^3$ is hydrogen, lower alkyl, phenyl, lower alkylthio or lower alkylsulfinyl;

$R^4$ is halo, —S—$R^8$, phenyl-lower alkoxy, lower alkoxy, phenyloxy, or substituted phenyloxy wherein the phenyl ring bears one or two halogen, lower alkyl or trifluoromethyl groups;

$R^5$ and $R^8$ each is hydrogen or lower alkyl;

and physiologically acceptable acid addition salts thereof.

12. A composition comprising about 10 to 300 mg. of a compound of claim 1 and a physiologically acceptable carrier therefor.

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## 4,110,455
## 6-ARYL-S-TRIAZOLO-(4,3-A)-PYRIDO-(2,3-F)-1,4-DIAZEPINES

**Walter von Bebenburg, Buchschlag; Norbert Schulmeyer, Morfelden, and Vladimir Jakovlev, Maintal, all of Fed. Rep. of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Fed. Rep. of Germany**

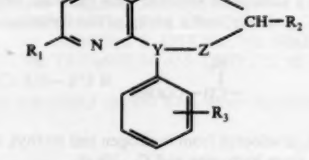
**Filed Oct. 26, 1976, Ser. No. 735,894**

**Claims priority, application Austria, Nov. 4, 1975, 8372/75**

**Int. Cl.[2] A61K** *31/44;* **C07D** *471/04*

**U.S. Cl. 424—256** **14 Claims**

1. A 6-aryl-s-triazolo-(4,3-a)-pyrido-(2,3-f)-(1,4)-diazepine compound of the formula:



I

wherein $R_1$ is hydrogen, a halogen atom, an alkyl group with 1 to 6 carbon atoms, a hydroxy group, an alkoxy group with 1 to 6 carbon atoms, an amino group, an aliphatic acylamino group with 2 to 6 carbon atoms, a monoalkylamino group with 1 to 6 carbon atoms or a dialkylamino group with 1 to 6 carbon atoms in each alkyl group,

$R_2$ is hydrogen, an alkyl group with 1 to 6 carbon atoms, a hydroxy group, an acyloxy group with 2 to 6 carbon atoms, an alkoxy group with 1 to 6 carbon atoms a halogen atom, an amino group, an aliphatic acylamino group with 2 to 6 carbon atoms, a monoalkylamino group with 1 to 6 carbon atoms or a dialkylamino group with 1 to 6 carbon atoms in each alkyl group,

$R_3$ is hydrogen, an alkyl group with 1 to 6 carbon atoms, an alkoxy group with 1 to 6 carbon atoms or a halogen atom,

the structural part A-B is the group —CO—$NR_4$,

wherein $R_4$ is hydrogen, an alkenyl group with 2 to 6 carbon atoms, an alkinyl group with 2 to 6 carbon atoms, a hydroxy-alkyl group with 1 to 6 carbon atoms, a ketoalkyl group with 1 to 6 atoms in the alkyl group, a cyanoalkyl group with 1 to 6 carbon atoms, an alkyl group with 1 to 6 carbon atoms, or an alkyl group of 1 to 6 carbon atoms substituted by an alkoxy group with 1 to 6 carbon atoms or a dialkylamino group with 1 to 6 carbon atoms in each alkyl group,

and Y-Z is the group >CH=N—, >C=N(→O), >CH—NH— or >CH—N(OH)—, their optical isomers and their pharmaceutically acceptable salts.

7. A method of relieving stress in a mammal comprising administering orally or parenterally to the mammal an amount of the composition of claim 1 sufficient to relieve stress.

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## 4,110,456
## 4-SUBSTITUTED-2-ARYLIMIDAZOLES

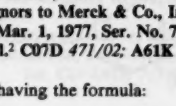
**John J. Baldwin, Lansdale, and Frederick C. Novello, Berwyn, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.**

**Filed Mar. 1, 1977, Ser. No. 773,248**

**Int. Cl.[2] C07D** *471/02;* **A61K** *31/34*

**U.S. Cl. 424—263** **4 Claims**

1. A compound having the formula:



wherein

$R_1$ is pyridyl,

$R_2$ is selected from the group consisting of $C_1$–$C_3$alkyl-S—, $C_1$–$C_3$alkyl-SO—, $C_1$–$C_3$alkyl-$SO_2$— and $R_3R_4N$-$SO_2$—, and

$R_3$ and $R_4$ are independently selected from H, $C_1$–$C_3$alkyl and hydroxy substituted $C_2$–$C_3$alkyl.

4. An antihypertensive composition comprising an effective amount of a compound selected from the group consisting of 2-(3-pyridyl)-4-methylsulfamoylimidazole and 2-(3-pyridyl)-4(5)-diethylsulfamoylimidazole.

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## 4,110,457
## BIS-ARYLALKYLAMINO-ARALKANES

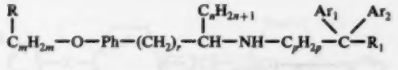
**John Elsworth Francis, Pleasantville, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation-in-part of Ser. No. 699,017, Jun. 23, 1976. This application Apr. 25, 1977, Ser. No. 790,530**

**Int. Cl.[2] A61K** *31/44;* **C07D** *213/36*

**U.S. Cl. 424—263** **8 Claims**

1. A 1-(azacyclic aralkoxyphenyl)-2 or 3-(bisaryl-alkylamino)-alkane of the formula



wherein R is unsubstituted 2-,3- or 4-pyridyl, or such radicals substituted by up to two members of lower alkyl, lower alkoxy or halogen, Ph is 1,3-or 1,4-phenylene, (lower alkyl)- 1,3- or 1,4-phenylene, (lower alkoxy)-1,3- or 1,4-phenylene, (halogeno)-1,3- or 1,4-phenylene or (trifluoromethyl)-1,3- or 1,4-phenylene, each of $Ar_1$ and $Ar_2$ is phenyl, (lower alkyl)-phenyl, (lower alkoxy)-phenyl, (halogeno)-phenyl or (trifluoromethyl)- phenyl, each of *m, n* and *p* is an integer from 1 to 4, *r* is the integer 1 or 2 and $R_1$ is hydrogen or hydroxy; or a therapeutically useful acid addition salt thereof.

**4,110,458**

## N-(PYRIDYL) OXAMIC ACID DERIVATIVES

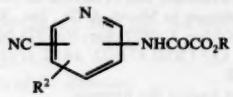
**John H. Sellstedt, Pottstown; Charles J. Guinosso, King of Prussia, both of Pa., and Albert J. Begany, Tucson, Ariz., assignors to American Home Products Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 669,569, Mar. 23, 1976, Pat. No. 4,054,661, which is a division of Ser. No. 542,465, Jan. 20, 1975, Pat. No. 3,966,965, which is a continuation-in-part of Ser. No. 344,466, Mar. 23, 1973, abandoned. This application Sep. 19, 1977, Ser. No. 834,615**

**Int. Cl.[2] A61K *31/34*; C07D *213/57***

**U.S. Cl. 424—263** **17 Claims**

1. A process for preventing the release of pharmacological mediators from an immediate hypersensitivity reaction between reaginic type antibodies and an antigen, thereby preventing the symptoms manifest in bronchial asthma, seasonal pollinosis, allergic rhinitis, urticaria, allergic conjunctivitis, food allergy and anaphylactoid reactions of a sensitized animal, which comprises prophylactically administering to said animal an effective amount of a compound of the formula:

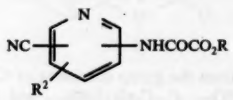


in which R is —H or lower alkyl;

$R^2$ is —H, lower alkoxy, lower halo or polyhalo(lower) alkyl;

or a pharmaceutically acceptable salt thereof.

3. A compound of the formula:



in which R is —H or lower alkyl;

$R^2$ is —H, lower alkoxy, lower alkyl, halo or polyhalo (lower)alkyl;

or a pharmaceutically acceptable salt thereof.

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**4,110,459**

## BENZOYLPIPERIDYLALKYLINDOLES IN ALLEVIATING PAIN

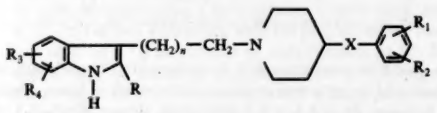
**Grover C. Helsley, Pottersville; Joseph T. Strupczewski, Flemington, and Beth Ann Gardner, Stanhope, all of N.J., assignors to American Hoechst Corporation, Bridgewater, N.J.**

**Division of Ser. No. 663,820, Mar. 4, 1976, Pat. No. 4,046,900, which is a continuation-in-part of Ser. No. 594,042, Jul. 8, 1975. This application Jun. 21, 1977, Ser. No. 808,513**

**Int. Cl.[2] A61K *31/445***

**U.S. Cl. 424—267** **1 Claim**

1. A method of alleviating pain which comprises adminsitering to a patient an amount pharmaceutically effective for relieving pain of a compound of the formula



wherein X is

R is hydrogen or methyl; $R_1$ and $R_2$ are the same or different and stand for hydrogen, halogen, straight or branched chain alkyl of up to 5 carbon atoms, alkoxy of up to 5 carbon atoms, trifluoromethyl, hydroxy, phenoxy or phenyl; $R_3$ and $R_4$ are hydrogen or methoxy; *n* is the integer 1 or 2, or an acid addition salt thereof prepared from a pharmaceutically acceptable acid.

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**4,110,460**

## 2,3-DIHYDRO-IMIDAZO[2,1-B]-THIAZOLE DERIVATIVES AND APPLICATIONS THEREOF

**Jacques Louis Edouard Baetz, La Garenne, France, assignor to Metabio, France**

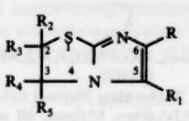
**Filed Mar. 4, 1977, Ser. No. 774,497**

**Claims priority, application United Kingdom, Mar. 10, 1976, 9517/76**

**Int. Cl.[2] C07D *277/60***

**U.S. Cl. 424—270** **10 Claims**

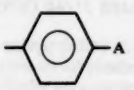
1. A compound selected from the group consisting of compounds of the formula:



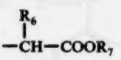
(I)

in which:

R represents a radical having the formula

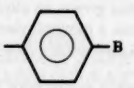


in which A is selected from a hydrogen atom; a chlorine atom; a bromine atom; a nitro group; a $C_{1-4}$ alkoxy group; a $C_{1-6}$ alkyl group; a phenyl group; a phenyl group substituted with a substituent selected from chlorine, bromine, nitro and $C_{1-4}$ alkoxy; and a group of the formula:



in which $R_6$ is selected from hydrogen and methyl, and $R_7$ is selected from hydrogen and $C_{1-6}$ alkyl;

$R_1$ is a group of the formula:



in which B is selected from chlorine, bromine and $C_{1-4}$ alkoxy,

$R_2$ is selected from hydrogen, methyl and phenyl,

$R_3$ is selected from hydrogen and methyl,

$R_4$ is selected from hydrogen and methyl,

$R_5$ is selected from hydrogen, methyl and ethyl,

and a pharmaceutically acceptable addition salt thereof.

## 4,110,461
## EFFECT OF DIPHENYLHYDANTOIN AND RELATED COMPOUNDS ON GLAUCOMA

**Bernard Becker; Robert L. Stamper, both of St. Louis, Mo.; Carl F. Asseff, Cleveland, Ohio, and Steven M. Podos, St. Louis, Mo., assignors to The United States of America as represented by the Department of Health, Education and Welfare, Washington, D.C.**

**Filed Mar. 19, 1973, Ser. No. 342,703**
**Int. Cl.[2] A61K *31/415***
**U.S. Cl. 424—273 R** **2 Claims**

1. A method of alleviating visual field loss associated with open-angle glaucoma in humans which comprises orally treating said humans suffering from glaucoma with diphenylhydantoin (DPH) administered in an oral daily dose of 200–900 mg in divided doses for 2–5 months.

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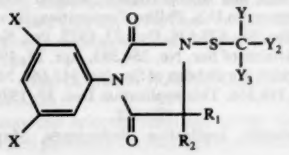
## 4,110,462
## N'-SULFENYL-N''-DIHALOPHENYLIMIDAZOLIDINEDIONES

**Chiyozo Takayama, Toyonaka; Shigeo Yamamoto, Sanda; Toshiro Kato, Ibaraki; Yoshio Hisada, Kawanishi, and Akira Fujinami, Takarazuka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Japan**

**Filed Dec. 3, 1976, Ser. No. 747,109**
**Claims priority, application Japan, Dec. 22, 1975, 50-154513**
**Int. Cl.[2] C07D *233/80;* A01N *9/12***
**U.S. Cl. 424—273 R** **5 Claims**

1. A microbicidal composition which comprises a microbicidally effective amount of a compound of the formula:



wherein X is a chlorine atom or a bromine atom, $Y_1$, $Y_2$ and $Y_3$ are each a chlorine atom or a fluorine atom and $R_1$ and $R_2$ are individually a hydrogen atom or a methyl group, and an inert carrier.

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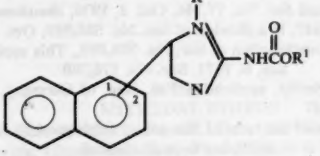
## 4,110,463
## IMIDAZOLE-2-CARBAMATES

**Colin C. Beard, Saratoga; Marshall B. Wallach, Mountain View, and Klaus Weinhardt, Redwood City, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.**

**Filed Jun. 3, 1977, Ser. No. 803,016**
**Int. Cl.[2] A61K *31/415;* C07D *233/46, 233/48***
**U.S. Cl. 424—273 R** **28 Claims**

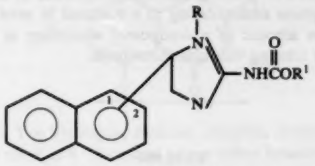
1. A compound chosen from those represented by the formula



(I)

wherein R is hydrogen or alkyl of 1 through 4 carbon atoms $R^1$ is alkyl of 1 through 6 carbon atoms, and the naphthyl group is attached at the 1- or 2- position of the naphthyl structure and the hydrogen anion addition salts thereof.

14. A method of producing a muscle relaxant effect in mammals which comprises administering an effective amount of at least one compound chosen from those represented by the formula



(I)

wherein R is hydrogen or alkyl of 1 through 4 carbon atoms, $R^1$ is alkyl of 1 through 6 carbon atoms, and the naphthyl group is attached at the 1- or 2- position of the naphthyl structure and the pharmaceutically acceptable salts thereof.

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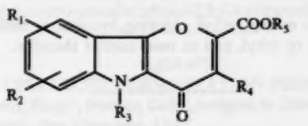
## 4,110,464
## INDOLOPYRONES HAVING ANTIALLERGIC ACTIVITY

**Richard E. Brown, Hanover, and Paul C. Unangst, Hacketts-town, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.**

**Division of Ser. No. 611,453, Sep. 8, 1975, Pat. No. 4,028,383. This application Feb. 25, 1977, Ser. No. 772,036**
**Int. Cl.[2] A61K *31/40***
**U.S. Cl. 424—274** **6 Claims**

1. A method for the prevention of allergic and asthmatic reactions in mammals which comprises parenterally administering to said mammals an effective amount sufficient to prevent allergic and asthmatic reactions in mammals of a compound of the formula:



I

wherein $R_1$ and $R_2$ may be hydrogen, hydroxy, lower alkoxy or lower alkyl of 1 to 6 carbon atoms, halogen, trifluoromethyl, or taken together to form a methylenedioxy group; $R_3$ may be hydrogen, lower alkyl of 1 to 6 carbon atoms or phenyl; $R_4$ may be hydrogen, lower alkyl of 1 to 6 carbon atoms or halogen; and $R_5$ may be hydrogen or lower alkyl of 1 to 6 carbon atoms.

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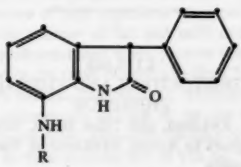
## 4,110,465
## 7-AMINO AND 7-ALKANOYLAMINO 2-OXO-3-PHENYLINDOLINES

**Richard E. Holmes, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.**

**Filed Nov. 25, 1977, Ser. No. 854,879**
**Int. Cl.[2] A61K *31/40;* C07D *209/34***
**U.S. Cl. 424—274** **6 Claims**

1. A compound of the formula



wherein R is H or $(C_1$–$C_3)$alkyl-CO.

4. A method of treating inflammation in a warm-blooded mammal which comprises administering to a warm-blooded mammal suffering from an inflammatory process an anti-

inflammatorially effective amount of a compound according to claim 1.

5. A method of treating vascular thrombosis in mammals which comprises administering to a mammal in need of such treatment an amount of a compound according to claim 1 effective for treating vascular thrombosis.

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4,110,466

## OXYINDOLE COMPOUND

Satoru Inoue, Nishinomiya; Tamon Uematsu, Toyonaka, and Norihisa Yamashita, Takarazuka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Japan

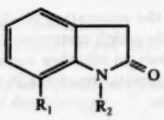
Filed Aug. 1, 1977, Ser. No. 820,942

Claims priority, application Japan, Aug. 10, 1976, 51-95877; Oct. 14, 1976, 51-123628

Int. Cl.[2] A01N *9/22*

U.S. Cl. 424—274 6 Claims

1. A method for controlling or preventing plant diseases caused by phytopathogenic fungi, which comprises applying to said fungi a fungicidally effective amount of a fungicidal composition which comprises a compound represented by the formula:



wherein $R_1$ is methyl, ethyl, chlorine, bromine or methoxy and $R_2$ is methyl or ethyl, and an inert carrier therefor.

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4,110,467

## PROPHYLACTIC, THERAPEUTIC OR HYGIENICAL AGENT AGAINST VIRUS DISEASES IN FISH AND USE THEREFOR

Tokuo Sano, Numazu; Takeo Oshima, Habikino, and Tokio Kamata, Hikone, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Filed Dec. 13, 1976, Ser. No. 751,327

Int. Cl.[2] A61K *31/335, 33/34;* A01K *61/00*

U.S. Cl. 424—280 4 Claims

1. A method for preventing virus disease selected from the group consisting of Infectious Haematopoietic Necrosis, Viral haemorrhagic Septicemia, Infectious Pancreatic Necrosis, Nerka virus disease and viral epizootics in fish selected from the group consisting of Salmonid and eels, which comprises bathing said fish in 20 to 10,000 ppm aqueous solution of erythorbic acid or its sodium salt and a water-soluble salt yielding 0.0001 to 10 ppm $Cu^{++}$ in said solution.

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4,110,468

## TROPONE DERIVATIVES AND THERAPUTIC USE THEREFOR

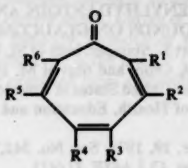
Jehan F. Bagli, Kirkland, and Tibor Bogri, Montreal, both of Canada, assignors to Ayerst, McKenna & Harrison Limited, Montreal, Canada

Division of Ser. No. 697,295, Jun. 17, 1976, Pat. No. 4,066,784. This application Oct. 7, 1977, Ser. No. 840,351

Int. Cl.[2] C07C *153/09;* A61K *31/265*

U.S. Cl. 424—301 6 Claims

1. A compound of formula



(1)

in which $R^1$, $R^2$, $R^3$, $R^4$, $R^5$ and $R^6$ are the same or different selected from the group consisting of hydrogen; halo, trifluoromethyl; lower alkoxy; lower alkyl; phenyl; hydroxy; phenoxy; mercapto; $NR^7R^8$ wherein each of $R^7$ and $R^8$ is hydrogen or lower alkyl; and a radical of formula $Y—CR^9R^{10}—COOR^{11}$ wherein Y is S, $R^9$ and $R^{10}$ together are oxo and $R^{11}$ is hydrogen or lower alkyl, with the proviso that one, two or three of $R^1$, $R^2$, $R^3$, $R^4$, $R^5$ and $R^6$ must be a radical of formula $Y—CR^9R^{10}—COOR^{11}$ wherein Y, $R^9$, $R^{10}$ and $R^{11}$ are as defined in each instance herein; or a therapeutically acceptable salt thereof.

5. A method for preventing or treating allergic conditions in a mammal which comprises administering to said mammal an allergy alleviating effective amount of a compound of claim 1, or a therapeutically acceptable salt thereof.

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4,110,469

## INSECTICIDAL N-(2,6-DICHLOROBENZOYL)-N'-(4-CYANOPHENYL) UREA

Kobus Wellinga, and Rudolf Mulder, both of Weesp, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Division of Ser. No. 625,126, Oct. 23, 1975, Pat. No. 4,013,717, which is a division of Ser. No. 354,393, Apr. 25, 1973, Pat. No. 3,933,908, which is a division of Ser. No. 143,668, May 14, 1971, Pat. No. 3,748,356. This application Dec. 29, 1976, Ser. No. 755,432

Claims priority, application Netherlands, May 15, 1970, 7007040

Int. Cl.[2] A01N *9/20;* C07C *127/22*

U.S. Cl. 424—304 3 Claims

1. N-(2,6-dichlorobenzoyl)-N'-(4-cyanophenyl)urea.

2. An insecticidal composition comprising a finely divided inert carrier and an insecticidally effective amount of N-(2,6dichlorobenzoyl)-N'-(4-cyanophenyl) urea.

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4,110,470

## PHARMACEUTICAL COMPOSITION COMPRISING D,L-α-METHYL-THYROXINE ETHYL ESTER AND THE SALTS THEREOF AND THE CONTROL OF CHOLESTEROL AND TRIGLYCERIDE BLOOD LEVEL THEREWITH

Horst Kummer, Rheinecke 14, 67 Ludwigshafen am Rhein, and Ruediger Beckmann, Elsa-Brandstroem-Strasse 10, 51 Aachen, both of Fed. Rep. of Germany

Continuation-in-part of Ser. No. 38,647, May 22, 1970, Pat. No. 3,930,017, and Ser. No. 77,744, Oct. 2, 1970, abandoned, said Ser. No. 38,647, is a division of Ser. No. 584,089, Oct. 4, 1966, which is a continuation of Ser. No. 584,089,. This application Sep. 8, 1971, Ser. No. 178,780

Claims priority, application Fed. Rep. of Germany, Oct. 7, 1965, 1493567

The portion of the term of this patent subsequent to Dec. 30, 1992, has been disclaimed.

Int. Cl.[2] A61K *31/24*

U.S. Cl. 424—309 19 Claims

1. A pharmaceutical composition suitable for controlling the cholesterol and triglyceride blood level in a human comprising D, L-alpha-methyl-thyroxine ethyl ester in a pharmaceutically acceptable carrier said ester being present in an amount sufficient to control the cholesterol and triglyceride blood level.

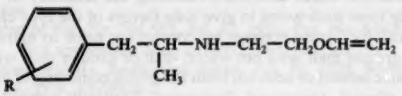
4,110,471

## N-VINYLOXYETHYL-α-METHYL-β-PHENETHYLAMINES AS ALCOHOL INTAKE SUPPRESSING AGENTS

Bruce Wayne Horrom, Waukegan, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Filed Sep. 8, 1976, Ser. No. 721,614
The portion of the term of this patent subsequent to Dec. 21, 1993, has been disclaimed.
Int. Cl.[2] A61K *31/135*
U.S. Cl. 424—330 3 Claims

1. A method of suppressing alcohol intake in mammals comprising administering a therapeutically effective amount of a compound of the formula



where R is H, halo, or $CF_3$ and acid addition salts thereof to said mammal.

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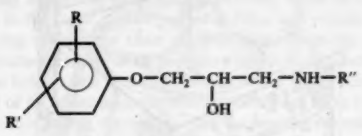
4,110,472

## DERIVATIVES OF 1-(DISUBSTITUTED PHENOXY)-3-AMINO-2-HYDROXYPROPANES

Rudolf Hiltmann; Arend Heise; Stanislav Kazda, and Friedrich Hoffmeister, all of Wuppertal, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Fed. Rep. of Germany

Filed Oct. 13, 1976, Ser. No. 732,118
Claims priority, application Fed. Rep. of Germany, Oct. 23, 1975, 2547524
Int. Cl.[2] A01N *9/24*; C07C *93/06*
U.S. Cl. 424—330 20 Claims

1. A compound selected from the group consisting of a 1-(disubstituted phenoxy)-2-hydroxypropylamine derivative of the formula:



wherein
R is lower alkyl, lower alkenyl, lower alkoxy, or chloro;
R′ is lower alkyl, lower alkenyl, lower alkoxy, or chloro;
R″ is diphenylmethyl or fluoren-9-yl; and
the pharmaceutically acceptable acid addition salts thereof.

19. The method of combatting cerebrovascular insufficiency and producing psychostimulation in humans and other animals which comprises administering thereto an effective amount of a compound according to claim 1.

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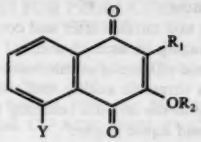
4,110,473

## MITICIDAL ETHERS

Robert Benson Fugitt, Newark, Del., and Gregory Wayne Schwing, Lincoln University, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jul. 14, 1977, Ser. No. 815,763
Int. Cl.[2] A01N *9/24*
U.S. Cl. 424—331 5 Claims

1. A method for protecting plants from mites which comprises applying to the plant a miticidally effective amount of a compound of the Formula I



wherein Y is hydrogen, fluorine, chlorine, or bromine;
$R_1$ is alkyl of 8–14 carbon atoms either branched, cyclic, or straight chain;
$R_2$ is saturated alkyl of 1–12 carbon atoms or unsaturated alkyl of 3–12 carbon atoms either branched or straight chain, optionally substituted with one or two chlorine, bromine, methoxy or ethoxy substituents, or cycloalkyl of 3–6 carbon atoms.

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4,110,474

## TETRAMETHYLPENTANE BLOOD SUBSTITUTES

Richard J. Lagow, Austin, Tex.; Lawrence A. Shimp, Hinsdale, Ill., and Leland C. Clark, Jr., Cincinnati, Ohio, assignors to Suntech, Inc., Philadelphia, Pa. and Children's Hospital Medical Center, Cincinnati, Ohio

Filed Aug. 26, 1977, Ser. No. 827,999
Int. Cl.[2] A61K *31/02*
U.S. Cl. 424—350 17 Claims

1. An artificial blood comprising an emulsion of a mixture comprising perfluoro 2,2,4,4-tetramethylpentane and 3-hydrononadecafluro 2,2,4,4-tetramethylpentane in water, said emulsion containing a non-toxic emulsifier.

17. A mixture comprising perfluoro-2,2,4,4-tetramethylpentane and 3-hydro-nonadecafluro-2,2,4,4-tetramethylpentane.

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4,110,475

## CELLULOSE FERMENTATION PROCESS

Malcolm S. Singer, Novato, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed May 11, 1977, Ser. No. 795,680
Int. Cl.[2] A23K *1/16*
U.S. Cl. 426—2 8 Claims

1. A method for accelerating the rate of cellulose fermentation by cellulose-digesting rumen microorganisms which comprises conducting said fermentation in the presence of a rate-accelerating amount of a compound selected from 2-(chloromethyldithio)acetic acid, 2-(dichloromethyldithio)acetic acid or 2-(trichloromethyldithio)acetic acid.

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4,110,476

## PREPARATION OF LIQUID AND FROZEN YOGURT PRODUCTS

Kenneth H. Rhodes, San Jose, Calif., assignor to Johnson/-Rhodes Cultured Foods, Inc., Calif.

Filed Jan. 10, 1977, Ser. No. 758,045
Int. Cl.[2] A23C *9/12, 21/00*; A23G *5/00*
U.S. Cl. 426—41 19 Claims

1. A process for the preparation of a liquid yogurt containing a high population of live organisms comprising the steps of:
a. combining sources of fat and milk derived solids with relatively undenatured whey protein concentrate to form a mixture in the ratio of no more than 2 parts casein to 1 part whey protein, the source of whey protein being whey protein concentrate having all of the casein coagulant enzyme inactivated, the whey protein concentrate having from 22 to 52% protein, 0.1 to 6% fat, 32 to 73% of the material selected from the group consisting of lactose and reduced milk sugars, and from 3 to 11% ash, all percentages being on a dry weight basis;
b. maintaining said mixture at a temperature to accomplish pasteurization and form a protein complex;

c. thereafter cooling said mixture to an optimum fermentation temperature;
d. innoculating said mixture after said cooling with a yogurt culture producing lactic acid; and
e. fermenting said mixture after said innoculation sufficiently to develop a titratable acidity and cooling to arrest fermentation upon the mixture reaching the desired acidity to produce said liquid yogurt.

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**4,110,477**

## METHOD FOR PRODUCING NATTO CONTAINING LACTIC ACID BACTERIA

**Kintaro Naruse, and Wataru Naruse, both of Tokyo, Japan, assignors to Kabushiki Kaisha Naruse Fermentation Laboratory, Tokyo, Japan**

**Filed May 13, 1977, Ser. No. 796,706**
**Int. Cl.[2] A23L *1/20***
**U.S. Cl. 426—46** **14 Claims**

1. A method for producing *natto* containing lactic acid bacteria, which comprises growing *Bacillus natto* and lactic acid bacteria on steamed soybeans in the presence of a nutritive medium containing a homogenized aqueous mushroom suspension.

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**4,110,478**

## PRODUCTION OF POTATO GRANULES

**Buncha Ooraikul, Edmonton, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Canada**

**Continuation-in-part of Ser. No. 476,053, Jun. 3, 1974, Pat. No. 4,007,286. This application Dec. 13, 1976, Ser. No. 750,164**
**The portion of the term of this patent subsequent to Feb. 8, 1994, has been disclaimed.**
**Int. Cl.[2] A23B *7/14***
**U.S. Cl. 426—262** **24 Claims**

1. A method for the preparation of dehydrated potato granules which comprises subjecting potatoes to the following steps in order:
(a) preparing the potatoes for cooking;
(b) cooking the prepared potatoes;
(c) immediately mashing the cooked potatoes at a temperature of at least 160° F;
(d) cooling and freezing the resulting material;
(e) thawing the material;
(f) immediately predrying the thawed material by evaporation to reduce the moisture content to a range of about 35 to 46%, thereby producing potato cells which are separated into single units or cell aggregates;
(g) thereafter granulating the predryed material under conditions such that the moisture content remains within the range specified in step (f) during the entire granulating operation; and
(h) drying the potato granules at a temperature and for a period of time to reduce the moisture content to not more than about 7%.

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**4,110,479**

## METHOD OF PREPARING COLLAGEN STRUCTURES

**Thomas Engel Higgins, Brookfield, Ill., assignor to Union Carbide Corporation, New York, N.Y.**

**Filed Mar. 31, 1977, Ser. No. 783,426**
**Int. Cl.[2] A22C *13/00***
**U.S. Cl. 426—277** **24 Claims**

1. In a method of producting a shaped collagen structure the improvment comprises treating a shaped collagen structure prior to the final drying thereof with a dewatering solution comprising at least about 0.01% by weight of sodium alginate.

**4,110,480**

## TREATMENT OF MALT TO REDUCE STALE FLAVOR IN BEER

**James Richard Allan Pollock, Reading, and Anthony Richard Dale, Mortimer, near Reading, England, assignors to Pollock International Limited, Reading, England**

**Filed Jul. 23, 1975, Ser. No. 598,421**
**Claims priority, application United Kingdom, Jul. 24, 1974, 32704/74**
**Int. Cl.[2] C12C *1/16, 1/18***
**U.S. Cl. 426—436** **7 Claims**

1. In a method of producing a wort for use in brewing which comprises extracting a ground malt with hot water to orm a wort and separating the wort from insolublematter, the improvement which comprises reducing the tendency of beers made from such worts to give stale flavors of the type characterized by 2-trans-nonenal by contacting, prior to extracting the ground malt with hot water, malt or ground malt with an organic substance selected from the group consisting of methanol, ethanol, 1-propanol, 2-propanol, 2-butanol, isoamyl alcohol, 2-phenylethanol, dimethylsulfoxide, acetic acid, and propylene glycol to reduce the amount of precursors of 2-trans-nonenal present in said malt or ground malt.

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**4,110,481**

## METHOD OF COOKING FOOD IN HOT NON-AQUEOUS LIQUIDS UNDER AIR PRESSURE

**Charles Jere Albright, 919 No. Michigan Ave., Chicago, Ill. 60611; Clifford E. Fitch, Sr., and Clifford E. Fitch, Jr., both of P.O. Box 219, South Holland, Ill. 60473**

**Continuation of Ser. No. 412,624, Nov. 5, 1973, abandoned, which is a continuation-in-part of Ser. No. 881,230, Dec. 1, 1969, Pat. No. 3,793,940. This application Aug. 9, 1976, Ser. No. 712,747**
**Int. Cl.[2] A23L *1/00***
**U.S. Cl. 426—438** **26 Claims**

1. The method of cooking food in hot, non-aqueous liquid under pressure, comprising the steps of: providing a plurality of pressurizable, sealable cooking receptacles each having an opening therein for the insertion and removal of food; interconnecting the plurality of receptacles via valve-controlled, fluid conducting conduits; placing cooking liquid in at least one but not all of said plurality of receptacles and closing and sealing said at least one receptacle and heating the liquid therein to a temperature sufficient to cook food; placing food to be cooked in another of said plurality of receptacles substantially free of cooking liquid therein; closing and sealing said another receptacle; pressurizing with mechanical means the liquid in said one receptacle to a pressure sufficient to substantially prevent vaporization of juices from the food at said temperature and transferring said liquid under said pressure from said at least one receptacle to said another receptacle; maintaining said pressure and temperature in said another

receptacle for a predetermined time sufficient to cook the food therein; draining the cooking liquid from said another receptacle at the end of said predetermined time while maintaining said pressure therein; thereafter venting the pressure from said another receptacle; opening said another receptacle and removing the cooked food therefrom.

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4,110,482

## METHOD FOR CONTINUOUSLY ROLLING UP SHEETS OF BAKED COOKIES

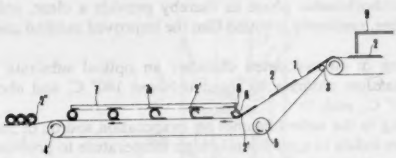
**Fumio Sato, Zama, Japan, assignor to Morinaga & Co., Ltd., Japan**

**Division of Ser. No. 704,552, Jul. 12, 1976, Pat. No. 4,043,259. This application Mar. 30, 1977, Ser. No. 782,731**

**Claims priority, application Japan, Jul. 19, 1975, 50-88955; May 19, 1976, 51-58429**

**Int. Cl.[2] A21C** *3/06*

**U.S. Cl. 426—497** **5 Claims**



1. A method of forming sheets of cookie material into rolls, comprising heating the cookie sheet material until it is relatively soft, advancing the sheets in order to feed them and bring them tangentially into association with a roll-up roller, rotating the roll-up roller at a slower speed than the speed of advance of the sheet material so as to cause the continuous rolling up of the sheet material onto the surface of the roll-up roller, interrupting the rolling up of the sheet material by deflecting its surface away from the roll-up roller while continuing to feed it in a direction away from said roll-up roller, continuing to feed the sheet material away from the roll-up roller while a portion of its periphery which has already been rolled is held so that it does not move as fast as the remaining portion of the sheet material which is being fed so as to cause a continuous rolling thereof in order to complete the rolling up of the sheet material into a rolled up form.

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4,110,483

## METHOD OF STABILIZING FOODS WITH AN ANTIOXIDANT

**Solomon J. Bishov, Framingham, Mass., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Aug. 1, 1977, Ser. No. 820,473**

**Int. Cl.[2] A23L** *3/34*

**U.S. Cl. 426—542** **4 Claims**

1. A process for the stabilization against oxidation of an oxidation susceptible oil or fat containing food, which comprises adding to said food an antioxidative amount of an antioxidant composition comprising (a) butylated hydroxyanisole and (b) an antioxidant-containing material selected from the group consisting of whole sage, mace, rosemary, Comptonia peregrina, and Tilia hrezentia, or alcohol extracts thereof, or residue recovered from said extracts, said antioxidant-containing material being present in said antioxidant composition in an amount which is effective as a synergist for the anti-oxidant action of said butylated hydroxyanisole.

4,110,484

## FLOW PROCESS FOR PRODUCTION OF IMITATION CHEESE

**Charles E. Rule, Lakewood; Juan B. Ilagan, and Donald E. Miller, both of Strongsville, all of Ohio, assignors to SCM Corporation, New York, N.Y.**

**Filed Sep. 10, 1976, Ser. No. 721,972**

**Int. Cl.[2] A23C** *19/02, 19/12*

**U.S. Cl. 426—582** **16 Claims**

11. A process for the continuous manufacture of acid-set imitation cheese products from a plurality of dry and liquid cheese making edible ingredients comprising the steps of

preparing a dry blend of said ingredients which are dry including an edible protein;

preparing a liquid blend of said ingredients which are liquid including oil, water and acidulant;

the proportions of said ingredients being those necessary for the manufacture of imitation cheese;

continuously introducing said dry blend into an elongated, confined mixing zone of small cross-sectional areas;

continuously introducing said liquid blend into said mixing zone;

continuously subjecting said blends to medium high intensity mixing while conveying the resulting mixture of said mixing through said zone until a substantially homogeneous mixture is obtained;

maintaining said mixture at an elevated temperature of at least about 100° F during said mixing;

continuously withdrawing imitation cheese products from said elongated, confined mixing zone;

said mixing zone including radial and axial flow, the proportions of said dry blend and liquid blend ingredients producing a substantially incompressible mixture of high viscosity; said mixing being carried out at a net horsepower input at the rate of about 2–5 per 40 pounds of edible ingredients.

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4,110,485

## HIGH-SHEEN ROAST AND GROUND COFFEE FLAKES OF IMPROVED EXTRACTABILITY

**Dennis Robert Grubbs, Cincinnati; Timothy Andrew Lubsen, Springfield Township, Hamilton County, and George Leroy Roseberry, Jr., Colerain Township, Hamilton County, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Continuation of Ser. No. 529,652, Dec. 4, 1974, abandoned. This application May 6, 1976, Ser. No. 683,583**

**Int. Cl.[2] A23F** *1/00*

**U.S. Cl. 426—595** **10 Claims**

1. A roast and ground coffee composition comprising from 10 to 80% by weight of the composition of roast and ground coffee in the form of flakes of high sheen and extractability, said roasted and ground flaked having a flake thickness of between 0.008 and 0.025 in. and having a reflectance value of at least 35 reflectance units, said reflectance units representing reflectance by coffee flakes of light from 0.88 helium/neon gas laser beam of 6328 Angstrom wavelength, calibrated against reflectance values of 2 and 89 units, respectively, for the Federal Bureau of Standards Paint Chips 15042 and 11670; and from 20 to 90% of non-flaked roast and ground coffee.

4. A process for preparing roast and ground coffee flakes of high sheen and extractability which comprises: passing roast and ground coffee through a roll mill having a first roll operating at a peripheral surface speed of from 30 to 850 feet per minute and at a surface temperature of from 0° to 140° F and having a second roll operating at a peripheral surface speed of from 2 to 8 times that of the first roll and a surface temperature of from 150° to 300° F; and removing from said roll mill said roast and ground coffee flakes.

4,110,486

## ELECTROSTATIC POWDER COATING METHOD

Adrien Lacchia, 10 Impasse des Lecheres, 38240 Meylan, France

Continuation-in-part of Ser. No. 640,924, Dec. 15, 1975, abandoned. This application Sep. 24, 1976, Ser. No. 726,105
Claims priority, application France, Jan. 16, 1975, 75 02009
Int. Cl.[2] B05D 1/06
U.S. Cl. 427—27 3 Claims

1. Method of forming and directing a homogeneous flat fan-spray of electrically charged particles derived from an incident stream containing a mixture of particles and carrier gas toward an article which is to be electrostatically coated with particles, which method comprises the steps of:

deflecting said incident stream outwardly in a direction substantially perpendicular to its incident direction,

driving said deflected stream against the internal walls of a duct shaped to form the stream into a substantially homogeneous flat fan-spray, and

then electrically charging the particles of said spray.

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4,110,487

## DUAL COAT CERAMIC LAYER PREPARED BY SINGLE FIRING

Richard G. Rion, Parma, Ohio, assignor to Ferro Corporation, Cleveland, Ohio

Filed Oct. 28, 1976, Ser. No. 736,569
Int. Cl.[2] B05D 1/04, 3/02, 1/36
U.S. Cl. 427—27 16 Claims

1. A process for applying a dual coat ceramic layer to a substrate in a single firing operation, comprising applying to the substrate a first coat of an essentially dry powder of a first frit composition adapted to form a glass adherent to said substrate, applying to said first coat a second coat of an essentially dry powder of a second frit composition normally not adapted as a glass to adhere to said substrate, subjecting said substrate and coats to a single firing operation, initially fusing and completely stabilizing said first frit composition within a temperature range below that at which said second frit composition first fuses and stabilizes, then fusing and stabilizing said second frit composition within a temperature range higher than said first temperature range, whereby said first coat reaches a state of neither tension nor compression at a temperature below that at which said second coat first reaches a state of neither tension nor compression, and finally cooling to form a coherent ceramic layer of two substantially continuous coats on said substrate from the two frit compositions.

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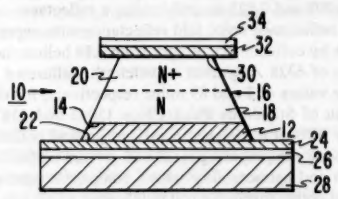
4,110,488

## METHOD FOR MAKING SCHOTTKY BARRIER DIODES

John Joseph Risko, Cranbury, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 9, 1976, Ser. No. 675,638
Int. Cl.[2] H01L 21/66, 29/48
U.S. Cl. 427—84 9 Claims




1. A method for making a Schottky barrier device comprising the steps of:

forming a thin layer of a natural oxide of silicon adjacent the principal surface of a substrate of silicon;

forming a layer of a Schottky metal adjacent said oxide layer; and

heating the Schottky metal layer and the substrate at a selected temperature, the temperature being sufficient to form a metal silicide whereby a metal silicide layer is formed between said substrate and said oxide layer, and thereafter removing said oxide layer whereby said metal silicide layer is exposed.

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4,110,489

## PREPARATION OF LOW ABSORPTION TRANSPARENT THALLIUM IODIDE FILMS ON POTASSIUM CHLORIDE

John H. Chaffin, III, Minnetonka, and Richard A. Skogman, Inver Grove Hts., both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jun. 8, 1977, Ser. No. 804,665
Int. Cl.[2] G02B 1/10
U.S. Cl. 427—164 9 Claims

1. A method of depositing an optical film of thallium iodine in its cubic phase on potassium chloride optical elements and thereafter allowing the thallium iodide film to transform to its stable orthorhombic phase to thereby provide a clear, polycrystalline, randomly oriented film the improved method comprising:

heating in an evacuated chamber an optical substrate of potassium chloride to about between 140° C. and about 170° C.; and,

heating in the same chamber an evaporation source of thallium iodide to a sufficiently high temperature to provide a deposition rate of at least 500Å per minute onto said potassium chloride substrate, the thallium iodide being deposited in its cubic phase.

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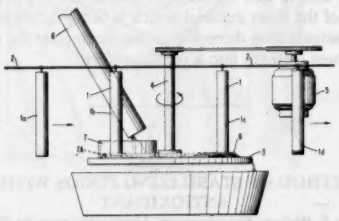
4,110,490

## METHODS FOR APPLYING MATERIAL TO THE END OF ELONGATE OBJECTS

Erik Westberg, Lidingo, Sweden, assignor to Aktiebolaget Tudor, Sundbyberg, Sweden

Filed Apr. 13, 1976, Ser. No. 676,624
Claims priority, application Sweden, Apr. 23, 1975, 7504727
Int. Cl.[2] B23K 31/02
U.S. Cl. 427—180 5 Claims



1. A method of applying a flowable material to the ends of a series of elongate objects comprising the steps of:

spreading the material onto a carrier in the form of an endless field,

continuously rotating the carrier and material,

moving said end of each object through the material field by:

passing said object end through said material field at a first location in a direction laterally of a first direction of travel of said material at said first location, such that said material approaches one side of said object end,

passing said object out of said material field, and

passing said object end through said material field at a second location in a direction laterally of a second direction of travel of said material at said second location, said second direction of travel of said material being different

than said first direction of travel in relation to said object so that said material approaches another side of said object end;

supporting each object completely independently of said carrier during travel of said object through said material to maintain the end of said object a substantially constant distance from said carrier during travel of said object through said material at said first and second locations,

regulating the relative rate of travel between said object and said carrier so that a track formed in said field of material by said object passing therethrough at said first location is spaced from said second location during passage therethrough of said object.

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**4,110,491**

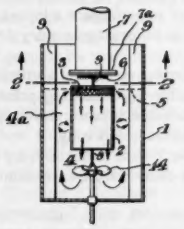
## METHOD AND APPARATUS FOR ENCAPSULATING AND COAGULATING ELASTOMERS

**Robert Miller Secor, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Jun. 29, 1976, Ser. No. 700,966**

**Int. Cl.[2] B05B *7/02, 7/24;* C08C *1/14***

**U.S. Cl. 427—212** **2 Claims**



1. A method for encapsulating and coagulating elastomer latices comprising, in sequence, supplying said latices as multiple streams of separate drops by gravity fall through the surface of an encapsulating-coagulating liquid, followed by liquid-impelled generally linear transit of the particles through a vertically oriented flow-constrained zone to which encapsulating-coagulating liquid is supplied continuously at the top end and suspending the particles outside said flow-constrained zone while recycling said encapsulating-coagulating liquid from the lower end of said flow-constrained zone into said top end free of solid product particles.

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**4,110,492**

## METHOD FOR ENCAPSULATING WATER-INSOLUBLE PARTICLES

**Clifford C. Hayman, Mentor, Ohio, assignor to The Harshaw Chemical Company, Cleveland, Ohio**

**Filed Nov. 11, 1976, Ser. No. 740,905**

**Int. Cl.[2] B32B *9/00, 15/02***

**U.S. Cl. 427—214** **10 Claims**

1. The method for encapsulating a solid particulate substrate comprising continuously adding to an aqueous dispersion of a water-insoluble particulate substrate at 70° to 100° C. separate aqueous solutions of:

(a) metal ions selected from the group consisting of aluminum and magnesium, said ions being added as lower alkyl carboxylates and/or halogen-substituted lower alkyl carboxylates,

(b) phosphate anions added as acids selected from the group consisting of orthophosphoric acid, monofluorophosphoric acid and difluorophosphoric acid, at least some of the phosphate present in the form of a hydroxy aluminum phosphate boric acid complex, and, optionally,

(c) anions selected from the group consisting of boric acid, fluoride, fluoborate and hexafluorophosphate anions, the molar proportions of (a), (b) and (c) being in the range of 0.8:1.0:0.0 to 1.4:1.0:10.0, and other anions and cations in or added to said dispersion being such as not to react with said substrate and not to interfere with the formulation of insoluble metal phosphate complexes of (a) and (b).

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**4,110,493**

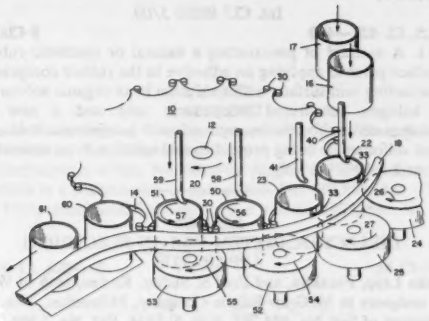
## SYSTEM AND METHOD FOR COATING CONTAINER SEAMS

**John H. Loveless, and Claude T. Phillips, both of Arden, N.C., assignors to Gerber Products Company, Fremont, Mich.**

**Filed Oct. 6, 1975, Ser. No. 619,875**

**Int. Cl.[2] B21D *51/00;* B05D *7/22***

**U.S. Cl. 427—233** **4 Claims**



1. A method of coating the inside surface of a metal container during its continuous advance along a series of processing stations, comprising the steps of:

rotating the container about an axis generally parallel to the soldered side seam;

engaging the seam of the container at a first station with seam engaging means to temporarily stop the container from rotating;

coating the interior of the container along the seam while the container is temporarily stopped from rotating to provide a protective coat overlying said seam;

disengaging said engaging means to allow the container to resume its rotation advancing the rotating container to a second station; and

coating substantially the entire inside of the container including the seam with a second protective coat while the container is rotating.

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**4,110,494**

## PROCESS FOR THE MANUFACTURE OF FILMS AND COATINGS CONTAINING POLYVINYL ALCOHOL AND HAVING A REDUCED SOLUBILITY IN WATER

**Hermann Schindler, Wallau, Taunus, and Wolfgang Zimmermann, Kelkheim, Taunus, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Dec. 16, 1976, Ser. No. 751,167**

**Claims priority, application Fed. Rep. of Germany, Dec. 20, 1975, 2557557**

**Int. Cl.[2] C08F *45/04***

**U.S. Cl. 427—385 R** **8 Claims**

1. A process for the manufacture of films and coatings containing polyvinyl alcohol and having a reduced solubility in water, which comprises submitting polyvinyl alcohol having an ester number of at most 200 mg of KOH/g in aqueous phase to an after-saponification with alkali metal or alkaline earth metal hydroxide at elevated temperature, precipitating the alkali metal or alkaline earth metal ions of said hydroxide by addition of a substance containing anions that form therewith a compound that is difficulty soluble in water, said compound constituting an inert filler that remains in the polyvinyl alco-

hol, applying the suspension of polyvinyl alcohol thus prepared to a substrate in the form of a film or coating and drying it.

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**4,110,495**

## IMPROVEMENTS IN SHOE MANUFACTURE

**Alan Reginald Carter, Kettering; Donald Pettit, Isham, both of England, and Josephus Sychbertus Langerwerf, Waalwijk, Netherlands, assignors to The Shoe and Allied Trades Research Association, Kettering, Great Britain**

**Filed Sep. 13, 1976, Ser. No. 722,692**

**Claims priority, application United Kingdom, Sep. 16, 1975, 38084/75**

**Int. Cl.² B05D** *5/00*

**U.S. Cl. 427—400** **9 Claims**

1. A method of pre-treating a natural or synthetic rubber surface prior to applying an adhesive to the rubber comprising contacting said surface with a solution in an organic solvent of a halogen substituted isocyanuric acid and a non N-halogenated sulfonamide, each of said isocyanuric acid and said sulfonamide being present in said solution in an amount of from 1 - 10% wt/vol.

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**4,110,496**

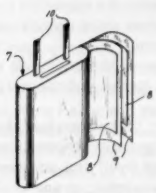
## DIELECTRIC SYSTEM FOR AN ELECTRICAL APPARATUS

**John Lapp, Franklin, and Fred S. Sadler, Racine, both of Wis., assignors to McGraw-Edison Company, Milwaukee, Wis.**

**Division of Ser. No. 494,767, Aug. 5, 1974, Pat. No. 3,996,505. This application Oct. 22, 1976, Ser. No. 735,020**

**Int. Cl.² B32B** *27/08*

**U.S. Cl. 428—500** **2 Claims**



1. A dielectric system for use in an electrical apparatus, comprising a layer of polymeric material, and a liquid dielectric impregnated into said polymeric material, said liquid dielectric comprising polybutene having an average number molecular weight in the range of 300 to 500 and containing from 0.01 to 10% by weight of a cyclohexylamine and from 0.05 to 15% by weight of a compound selected from the group consisting of butylated hydroxy toluene and di-tert-butyl-p-cresol.

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**4,110,497**

## STRIPED LAMINATE AND METHOD AND APPARATUS FOR MAKING SAME

**Steven Michael Hoel, Bolivar, Ohio, assignor to Snyder Manufacturing Co., Ltd., New Philadelphia, Ohio**

**Filed Jul. 2, 1976, Ser. No. 702,226**

**Int. Cl.² B32B** *3/16*

**U.S. Cl. 428—190** **5 Claims**

1. A striped laminate material comprising a first polyvinyl chloride sheet having a thickness on the order of 6 mils, an open, flexible scrim sheet of serpentine interlaced strands, a second polyvinyl chloride flexible sheet having a thickness on the order of 6 mils, a plastisol bonding agent bonding the scrim between the first and second sheets, and at least one flexible stripe of polyvinyl chloride film having a thickness on the order of 2½ mils and heat-bonded to the first sheet, the stripe being of a width less than the sheet to which the stripe is heat-bonded, and the stripe being impressed onto the sheet and into the laminate to provide a material having a striped surface of substantial planarity, and an embossed surface on the second

sheet on a sheet side opposite the side upon which the stripe is heat-bonded.

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**4,110,498**

## FABRIC TREATMENT COMPOSITIONS

**Lawrence Benjamin, Springfield Township, Hamilton County, and Michael Andrew Walsh, Fairfield, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Mar. 8, 1976, Ser. No. 664,837**

**Int. Cl.² D06M** *13/00*

**U.S. Cl. 428—35** **18 Claims**

1. An article of manufacture adapted for providing fabric softening within an automatic laundry dryer, said article comprising:

(a) a fabric softening amount of a softening composition, said composition having a melting point above about 38° C. and being flowable at fabric dryer operating temperature, said composition comprising:

(i) from about 50% to about 95% by weight of the composition of a quaternary ammonium fabric softener material; and

(ii) from about 5% up to about 50% by weight of the composition of lanolin alcohol component selected from the group consisting of lanolin alcohols, the aliphatic carboxylic acid esters of lanolin alcohols wherein the acid moieties of said esters contain from about 2 to about 22 carbon atoms and the propylene oxide adducts of lanolin alcohols wherein said adducts are the reaction product of from about 2 to about 20 moles of propylene oxide per mole of lanolin alcohols; and

(b) a dispensing means which provides for release of said softening composition within an automatic laundry dryer at dryer operating temperatures.

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**4,110,499**

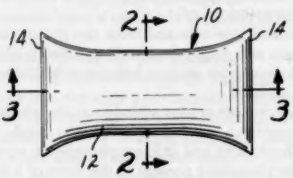
## FIRED CLAY PILLOWS AND STRUCTURES MADE THEREWITH

**George C. Harrison, Roseville, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.**

**Continuation of Ser. No. 649,546, Jan. 15, 1976, abandoned, which is a continuation-in-part of Ser. No. 546,708, Feb. 3, 1975, abandoned. This application Jan. 21, 1977, Ser. No. 761,265**

**Int. Cl.² B32B** *1/08, 5/16*

**U.S. Cl. 428—35** **39 Claims**




35. An article comprising a fired clay pillow, having a tubular-shaped body section whose ends are flattened closed; wherein the wall thickness of said body section is not greater

than three millimeters; wherein the length of said pillow is about 2.5 to 4 times as great as the outside diameter of said body section, and wherein said flattened ends are flared outwardly so as to project beyond said body section.

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## 4,110,500
## PACKAGED ARTICLES

**Theodore A. Evans, and William A. Watts, both of Uniontown, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Continuation of Ser. No. 728,483, Sep. 30, 1976, abandoned, which is a continuation-in-part of Ser. No. 618,301, Sep. 29, 1975, abandoned. This application Sep. 21, 1977, Ser. No. 835,259**

**Int. Cl.[2] B32B 7/02; B65D 71/00; C08L 51/00**

**U.S. Cl. 428—35** **23 Claims**

1. A packaging film composite having a thickness in the range of about 0.5 to about 10 mils comprised of an admixture of (1) about 80 to about 45 weight percent, based on 100 weight percent, of a unvulcanized elastomeric block copolymer having the general configuration A—B—A wherein each A is an independently selected nonelastomeric monovinyl aromatic hydrocarbon polymer block selected from styrene, α-methylstyrene and vinyl toluene having an average molecular weight of about 7,000 to about 25,000 and a glass transition temperature above about 25° C., the total block A content being from about 20 to about 40 percent by weight of the copolymer, and B is an elastomeric conjugated diene polymer block selected from 1,3-butadiene and isoprene having an average molecular weight from about 30,000 to about 100,000 and a glass transition temperature below about 10° C., said block copolymer being further characterized by having a melt viscosity in the range of about 0.1 to about 10 grams/10 minutes according to ASTM No. D-1238, (2) about 20 to about 55 weight percent of a thermoplastic resin selected from at least one polymer of styrene, α-methylstyrene, styrene/α-methylstyrene, vinyl toluene, vinyl toluene/α-methylstyrene, indene resins, alkyl phenolic resins, petroleum and coal tar resins, said resins characterized by being soluble in styrene and by having an intrinsic viscosity of about 0.02 to about 0.50 as determined in toluene at 30° C. and (3) a sufficient amount of an antiblocking agent.

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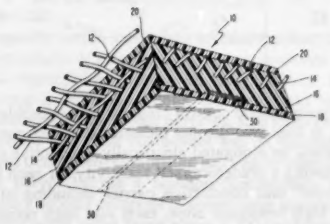
## 4,110,501
## SPLICING STRIP

**Harlan E. Tarbell, Torrance, Calif., and Paul J. Raabe, Lombard, Ill., assignors to Grefco, Inc., Bala Cynwyd, Pa.**

**Filed Apr. 5, 1977, Ser. No. 784,779**

**Int. Cl.[2] B32B 11/02, 11/10**

**U.S. Cl. 428—40** **19 Claims**



1. A splicing strip, comprising:

(a) a flexible, elongated reinforcing sheet of fibers with openings having a largest diameter of approximately 0.05 to 0.50 inches;

(b) a pair of tacky, mastic layers of material comprising by weight 10 to 50 parts of butyl rubber, 10 to 50 parts polybutene and 10 to 80 parts of filler selected from the group consisting of calcium carbonate, mineral fillers, asbestos, carbon black, shredded rubber and mixtures thereof, one of said mastic layers being disposed on each side of said flexible sheet, said mastic layers being in adherent contact with each other across the openings in said flexible sheet; and

(c) a stress distribution ribbon having a width substantially less than said splicing strip and being adhesively attached to and substantially on the longitudinal center line of the exposed face of at least one of said mastic layers, said ribbon being impermeable to said mastic.

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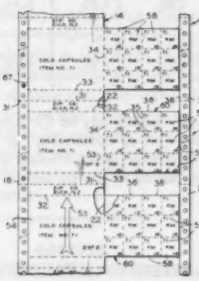
## 4,110,502
## LABELING

**James Baer, Aurora, Oreg., assignor to Pay Less Drug Stores Northwest, Inc., Beaverton, Oreg.**

**Continuation of Ser. No. 601,546, Aug. 4, 1975, abandoned, which is a continuation-in-part of Ser. No. 568,842, Apr. 17, 1975, abandoned. This application Jul. 22, 1977, Ser. No. 818,159**

**Int. Cl.[2] G09F 3/00**

**U.S. Cl. 428—40** **16 Claims**



16. In a computer strip form construction of a non-adhesive carrier strip having a pair of perforated feed portions along the side edges thereof and a central cut line paralleling the side edges and dividing the strip into a label portion and a price tag portion,

and a label-price tag strip having a label section and a price tag section side-by-side,

the label section comprising a series of labels separable from each other,

the label-price tag strip having on the back thereof a pressure sensitive adhesive adhered to the carrier strip and holding the label portion and the price tag portion of the carrier strip together with the label section adhered to the label portion and the price tag section adhered to the price tag portion,

the price tag section and price tag portion having cut-out portions to separate the price tag portion into a series of separated segments secured together only by one of the perforated feed portions so that when the price tag section and portion are folded back under the label section, they leave exposed at least part of the back side of each label,

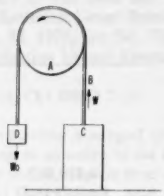
the edge of each price tag section adjacent its associated label section being secured to that label section along the entire length of that edge so that folding of the price tag sheet transversely of that edge is prevented,

each cutout portion extending below the upper edge of the adjacent label and also extending above the lower edge of the label just above the adjacent label.

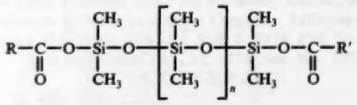
## 4,110,503
## MAGNETIC RECORDING MEMBERS

Hiroshi Ogawa; Masashi Aonuma; Matsuaki Nakamura, and Yasuo Tamai, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami Ashigara, Japan

Filed Dec. 3, 1976, Ser. No. 747,146
Claims priority, application Japan, Dec. 10, 1975, 50-147173
Int. Cl.[2] H01F *10/02*
U.S. Cl. 428—64 10 Claims




1. A magnetic recording member comprising a non-magnetic support having thereon a magnetic layer with a ferromagnetic powder dispersed in a binder, wherein the magnetic layer contains at least one organic silicone compound represented by the formula (I):




wherein R and R', which may be the same or different, each is an alkyl or alkenyl group containing 7 to 21 carbon atoms, and *n* is an integer of 0 to 50, in an amount of about 0.1 to about 5 parts by weight per 100 parts by weight of the ferromagnetic powder.

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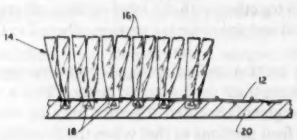
## 4,110,504
## SELF-SANITIZING CARPET CONSTRUCTION COMPOSITION

Ezekiel H. Hull, and Robert H. McIntosh, both of Greensboro, N.C., assignors to Anthony B. Askew, Atlanta, Ga.

Continuation of Ser. No. 571,717, Apr. 25, 1975, abandoned, which is a continuation-in-part of Ser. No. 478,109, Jun. 10, 1974, Pat. No. 3,919,410, which is a continuation of Ser. No. 292,792, Sep. 27, 1972, abandoned, which is a division of Ser. No. 139,265, Apr. 30, 1971, Pat. No. 3,705,235. This application Jun. 15, 1976, Ser. No. 696,219
The portion of the term of this patent subsequent to Dec. 5, 1989, has been disclaimed.
Int. Cl.[2] D03D *27/00*
U.S. Cl. 428—97 3 Claims




1. In a tufted carpet product including a primary backing sheet material, rows of carpet yarn stitched into the primary backing material to produce a face of yarn on one side of the backing and tuft loop backs of yarn on the opposite underside of the backing, and a layer of carpet construction adhesive on the tuft loop backs and on the underside of the backing, the improvement comprising a sanitizing additive blended with the carpet construction adhesive, said additive comprising a mixture of a nonionic trialkyl amine and a Group II-A or Group II-B metal salt of a monocarboxylic acid having a carbon chain length of 1 to 4.

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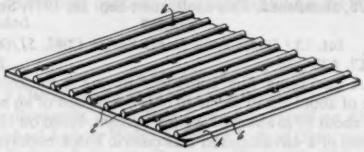
## 4,110,505
## QUICK BOND COMPOSITE AND PROCESS

Karl M. Prewo, Vernon, Conn., assignor to United Technologies Corp., Hartford, Conn.

Filed Dec. 17, 1976, Ser. No. 751,577
Int. Cl.[2] B32B *5/00, 15/04*
U.S. Cl. 428—114 7 Claims



5. A composite compacted in air comprising a plurality of tapes, each consisting of:
- a single sheet aluminum foil substrate,
- a collimated single layer of filaments on one side of said substrate, and
- a resin binder securing the filaments to the substrate,
- said plurality of tapes being stacked, one on another to form a stack consisting of alternate layers of foil with single layers of filaments therebetween, there being a single layer of foil between adjacent layers of filaments,
- said stack being heated and compacted in air, being heated to oxidize and eliminate the binder, and compacted to break up any carbonaceous remnants of the binder and to cause bonding of the adjacent foil layers to one another between the filaments to produce the composite.

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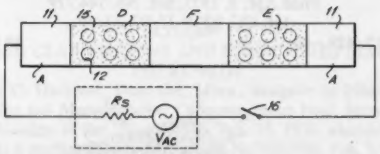
## 4,110,506
## THERMOPLASTIC CONTROL COMPLEX

Hugh V. Cottingham, Upper Montclair, and Joseph Scrocco, West Orange, both of N.J., assignors to BHN Corporation, Upper Montclair, N.J.

Filed Sep. 8, 1976, Ser. No. 721,652
Int. Cl.[2] B29C *27/00;* B32B *15/08;* E04B *1/38*
U.S. Cl. 428—138 16 Claims




1. A thermoplastic control complex for releasably securably bonding at least two distinct elements together comprising in combination, an elongated electrically conductive exothermic carrier having a predetermined resistivity for each lengthwise unit thereof, said conductive carrier including at least one discrete high resistance zone, each said high resistance zone being disposed at a predetermined position along the lengthwise extent thereof, each said high resistance zone being adapted in response to a current flow being effected through said conductive exothermic carrier to be heated to an elevated temperature level relative to the temperature level of those portions of said exothermic carrier that are free of heating zones formed therein, and a thermoplastic resin selectively positioned at each of said high resistance zones along the length of said exothermic carrier, said complex being adapted to be disposed between two distinct elements so that thermoplastic resin disposed at said high resistance zones is selectively

transformable from a non-sticky substantially solid state to a sticky substantially liquid state in response to said high resistance zone being heated to said elevated temperature level whereby said resin, in substantially sticky liquid state, effects wetting of the distinct elements for effecting subsequent releasable bonding of the elements together.

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**4,110,507**

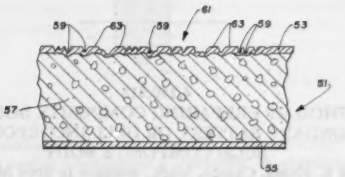
## BRANDED PLASTERBOARD PRODUCT

**Gary C. Colledge, P.O. Box 2178, Newport Beach, Calif. 92663**

**Continuation-in-part of Ser. No. 598,772, Jul. 24, 1975, Pat. No. 4,007,767, which is a continuation-in-part of Ser. No. 440,481, Feb. 7, 1974, abandoned, which is a division of Ser. No. 216,061, Jan. 7, 1972, Pat. No. 3,730,081. This application Feb. 14, 1977, Ser. No. 768,032**

**Int. Cl.[2] B32B** *21/06*

**U.S. Cl. 428—151** **4 Claims**




1. A decorative plasterboard product including a sheet having at least one outwardly facing paper-like layer bonded to a gypsum-based core, wherein the improvement in said plasterboard product is comprised of:

said paper-like layer being formed with a decorative pattern of recesses therein provided by a plurality of permanently compressed areas, said compressed areas of said paper-like layer being further charred to discolor their appearance to make said recesses forming said pattern visually perceptible, and said paper-like layer being formed as a continuous unbroken sheet over said pattern including said recesses.

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**4,110,508**

## FOAM SHEET AND METHOD

**Irving E. Isgur, Framingham; Andrew B. Holmstrem, Burlington, and Norman J. Hayes, Bedford, all of Mass., assignors to W. R. Grace & Co., Cambridge, Mass.**

**Filed Feb. 9, 1976, Ser. No. 656,674**

**Int. Cl.[2] B32B** *5/02, 5/16, 5/30*

**U.S. Cl. 428—240** **21 Claims**

1. A composite which comprises in combination, a fabric consisting essentially of a porous woven or non-woven fibrous web and a hydrophilic crosslinked polyurethane layered thereon having a three-dimensional network, said polyurethane comprising shredded foam particles, said foam being the reaction product of a resin component and an aqueous reactant, said resin component comprising isocyanate-capped polyoxyethylene polyol having a reaction functionality greater than two, and a second component comprising aqueous reactant, the water index value being about 1,300 to about 78,000 $H_20$ and wherein the capped polyoxyethylene polyol is present in the first component in an amount from about 3% by weight up to 100% by weight, wherein the capped polyoxyethylene polyol having a terminal member with an isocyanate functionality of two is present in an amount from 0% up to about 97% by weight, wherein the polyoxyethylene polyol moiety of the isocyanate capped member has a weight average molecular weight of about 200 to about 20,000 and a hydroxyl functionality of about 2 to about 8, and wherein the average particle size of the foam particles is about 0.02 inch mesh to about 0.12 inch mesh.

**4,110,509**

## PROCESS FOR IMPARTING FLAME RESISTANCE TO CELLULOSIC TEXTILE MATERIALS AND CELLULOSIC MATERIALS OBTAINED THEREBY

**Philip B. Roth, Bridgewater, N.J., assignor to American Cyanamid Company, Stamford, Conn.**

**Filed Mar. 23, 1977, Ser. No. 780,376**

**Int. Cl.[2] B05D** *3/10, 3/12*

**U.S. Cl. 428—276** **14 Claims**

1. A process for rendering a cellulosic textile material flame-resistant comprising;

impregnating the material with an aqueous solution of a partially polymerized methylolated phosphorus compound, prepared by reacting from about 4.0 to about 9.0 parts by weight of tetrakis(hydroxymethyl)phosphonium sulfate with about 1.0 part by weight of urea, to deposit thereon about 3.0–7.0 weight % phosphorus based on the weight of the untreated textile material;

partially drying the impregnated textile material;

impregnating the partially dried textile material with a thickened aqueous solution of ammonium hydroxide containing about 17–29% by weight of ammonia and sufficient water soluble thickening agent to provide a solution viscosity of about 500–10,000 centipoises at 25° C to deposit thereon about 2–6 gram-moles of ammonia per gram-atom of phosphorus present thereon, the temperature of the thickened ammonium hydroxide ranging from about 20° C. to about 60° C;

rolling the ammonium hydroxide-impregnated textile material;

storing the rolled material in a suitable sealed container for about ¼-60 minutes at ambient temperature to allow the formation of an unsoluble polymer within the rolled material from the reaction of said phosphorous compound and ammonium hydroxide impregnated therein;

recovering and unrolling the stored textile material; rinsing the unrolled textile material with water; and drying the treated textile material.

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**4,110,510**

## SOUND BARRIER MATERIAL

**Paul Edward Oliveira, New Bedford, Mass., assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Aug. 23, 1977, Ser. No. 827,036**

**Int. Cl.[2] B32B** *17/04*

**U.S. Cl. 428—285** **5 Claims**

1. A sound barrier material composed of a foam of about 1.5 to 2.5 pounds per cubic foot laminated to a polyvinyl chloride impregnated fiber sheet or mat, said sheet or mat having a coating of 0.02 to 3.2 inch gauge, said coating being chlorinated polyethylene containing barium sulfate.

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**4,110,511**

## PROCESS FOR THE PRODUCTION OF A PRESSURE-SENSITIVE CARBONLESS COPY SHEET USING MICROCAPSULES FORMED IN SITU IN A RADIATION CURABLE BINDER

**Yu-Sun Lee, Parma Heights, and Dale Richard Shackle, Chillicothe, both of Ohio, assignors to The Mead Corporation, Dayton, Ohio**

**Filed May 25, 1977, Ser. No. 800,561**

**Int. Cl.[2] B05D** *3/06*

**U.S. Cl. 428—307** **25 Claims**

1. A process for producing a liquid substantially solvent-free coating composition for use in the manufacture of pressure-sensitive carbonless transfer papers, said liquid coating composition being characterized by being radiation curable by polymerization to a dry, solid, tack-free resin substantially without the removal of solvents and other liquids and being further characterized by containing microcapsules having a hydrophilic core material, comprising the steps of:

(a) preparing a liquid hydrophilic emulsion component by

dispersing at least one chromogenic material in a hydrophilic liquid, said chromogenic material being soluble in said hydrophilic liquid;

(b) preparing a liquid hydrophobic emulsion component by dispersing an emulsifier in a radiation curable hydrophobic liquid;

(c) adding to said liquid hydrophobic emulsion component, with mixing, a first wall-forming material and second wall-forming material, said first and second wall-forming materials being soluble in said liquid hydrophobic emulsion component, said first wall-forming material being reactive with said second wall-forming material to form a polymeric capsule wall, said polymeric capsule wall being substantially insoluble in said liquid hydrophilic and said liquid hydrophobic emulsion components;

(d) mixing said liquid hydrophobic emulsion component with said liquid hydrophilic emulsion component to form an emulsion containing droplets of said liquid hydrophilic emulsion component dispersed in said liquid hydrophobic emulsion component; and

(e) maintaining said mixing for a period of time sufficient to allow said first and second wall-forming materials to react to form a dispersion of microcapsules in said liquid hydrophobic emulsion component, said microcapsules having capsule walls substantially impermeable to said liquid hydrophobic and said liquid hydrophilic emulsion components.

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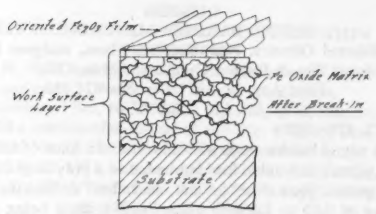
**4,110,512**

## IRON OXIDE MATERIAL AND MEMBERS FOR DRY LUBRICATED SYSTEMS INCLUDING THE METHOD OF PREPARATION THEREFOR

**Amedee Roy; Claude Belleau, both of Troy, and James M. Geyman, Harper Woods, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.**

**Filed Dec. 27, 1971, Ser. No. 212,249**
**Int. Cl.[2] B32B *15/16***
**U.S. Cl. 428—469** **14 Claims**




1. A member having a substrate and a working surface layer carried thereon, the working surface layer comprising:

a matrix consisting substantially of $Fe_3O_4$, the matrix containing an interspersed particle and debris trapping material therein, and

a substantially continuous film made up substantially of oriented $Fe_2O_3$ overlaying the matrix.

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**4,110,513**

## FIRE RESISTANT PLYWOOD

**Glenn Alvin Heitmann, Morrison, and Milton French Trosper, Jr., Littleton, both of Colo., assignors to Johns-Manville Corporation, Denver, Colo.**

**Filed Oct. 4, 1976, Ser. No. 729,500**
**Int. Cl.[2] B32B *21/08, 27/42***
**U.S. Cl. 428—528** **3 Claims**

1. A plywood body comprising at least two plies of wood bonded together by a phenolic resin adhesive, said adhesive having incorporated therethrough platey talc in an amount of 5 to 200 parts by weight per 100 parts by weight of said resin.

**4,110,514**

## WELD METAL DEPOSIT COATED TOOL STEEL

**Frederick Nicholson, Floda, Sweden, assignor to Elektriska Svetsningsaktiebolaget, Gothenburg, Sweden**

**Continuation-in-part of Ser. No. 702,469, Jul. 6, 1976, abandoned. This application Jul. 11, 1977, Ser. No. 814,453**
**Claims priority, application Sweden, Jul. 10, 1975, 7507899**
**Int. Cl.[2] B32B *15/18***
**U.S. Cl. 428—683** **13 Claims**

1. A weld metal deposit applied as a coating on a hot working tool, said deposit consisting essentially of 0.55% to 2.0% C, 0.2% to 4.0% Si, 0.2% to 3.0% Mn, 4.0% to 6.5% Cr, 2.5% to 15.0% Nb, 0% to 0.5% Ni, 0% to 3.5% strong carbide formers other than niobium selected from the group consisting of tungsten, molybdenum, vanadium, and titanium, the remainder being substantially iron, and the carbon and niobium content being in a ratio of one to the other as defined by the shaded area in FIG. 1 of the accompanying drawings.

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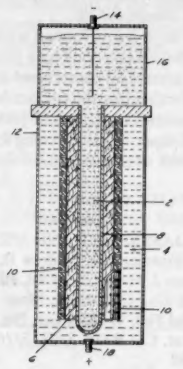
**4,110,515**

## METHOD OF PREPARING COMPOSITE BODY AND SECONDARY BATTERY OR CELL INCORPORATING SUCH COMPOSITE BODY

**Nirmal K. Gupta, Canton, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Filed Feb. 28, 1977, Ser. No. 772,617**
**Int. Cl.[2] C04B *37/00***
**U.S. Cl. 429—104** **11 Claims**




1. A method of preparing a composite body comprising a substrate having a felt prepared from materials selected from the group consisting of metal, carbon and graphite, bonded to a major surface thereof, wherein said method comprises:

(A) forming and curing a branched polyphenylene prepolymer having a number average molecular weight of between about 500 and about 800 and bearing terminal acetylene functionality to form a shaped, crosslinked body;

(B) preparing a solution of said branched polyphenylene prepolymer in an organic solvent in an amount ranging from about 1 to about 60 parts by weight of said prepolymer per 100 parts of said solution;

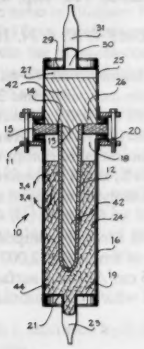
(C) preparing a composite of said shaped body and said felt to be bonded to a major surface thereof with said solution interposed between said shaped body and said felt;

(D) firing said composite in an inert atmosphere at a temperature of at least 800° C until the polymer in said solution and said shaped body is converted to vitreous carbon and said shaped body is integrally bonded to said felt.

## 4,110,516
## SODIUM-SULFUR CELL CASING

Manfred W. Breiter, Schenectady, N.Y., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Jun. 15, 1977, Ser. No. 806,723
Int. Cl.[2] H01M 4/36
U.S. Cl. 429—104 4 Claims



1. In a sodium-sulfur cell assembly a hermetically sealed sulfur cell casing comprising a container of aluminum, the interior side wall of said container being pre-etched and characterized by an electrically conducting corrosion resistant electrolytically applied layer of chromium overlying the pre-etched aluminum wall.

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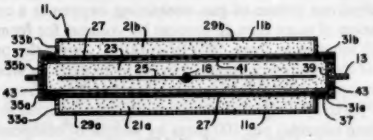
## 4,110,517
## ELECTROCHEMICAL CELL DESIGN

John D. Arntzen, Naperville, Ill., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jan. 11, 1978, Ser. No. 868,585
Int. Cl.[2] H01M 10/38
U.S. Cl. 429—133 10 Claims



1. An electrochemical cell including an array of three electrodes with a central electrode of opposite polarity to two outer electrodes, comprising in combination:

first and second housing halves adapted to engage together to define a cell containment volume, each housing half having side and edge walls, the side walls having a major central portion raised above offset perimetric margins, the edge walls including inward sections circumscribing the raised side-wall portions and including outward sections adapted to engage corresponding outward sections of a matching housing half;

means for fixedly attaching said first and second housing halves together;

outer electrodes of same polarity nested within the cell containment volume defined in each housing half by the raised central portion of the housing side walls;

a central electrode nested in the containment volume circumscribed by the outward sections of the edge walls, said central electrode having perimetric margins on opposing side surfaces facing the corresponding, internal surfaces of the side-wall perimetric margins; and

an electrically insulative separator, penetrable by liquid electrolyte, disposed between the central and each of the two outer electrodes and sealingly engaged between the perimetric margins of the center electrode and internal side-wall surfaces of the housing.

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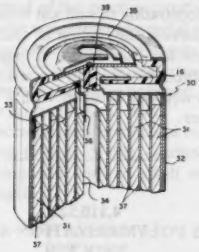
## 4,110,518
## FLUOROCARBON SEAL

Alexander Gilmour, Ewell Surrey, England, and Henry Rodgers Mallory, Greenwich, Conn., assignors to P.R. Mallory & Co. Inc., Indianapolis, Ind.

Filed Oct. 1, 1976, Ser. No. 728,673
Int. Cl.[2] H01M 2/08; C09J 5/00
U.S. Cl. 429—174 12 Claims



1. An electrochemical device including electrically conductive elements and a single element separating and electrically insulating one of the electrically conductive elements from the other electrically conductive element, said electrically insulating element being formed of a material comprising a polymeric, fluorocarbon with repeating units having the formula:

wherein $n$ is a whole number equal to or greater than 2 and wherein $x$ represents radicals, at least one of which within each repeating unit is a radical other than fluorine, and wherein the polymeric material comprises a coalesced material dielectrically separating and directly adhered to said electrically conductive elements.

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## 4,110,519
## METHOD FOR THE PRODUCTION OF ELECTRODES FOR LEAD STORAGE BATTERIES

Ove Nilsson, Nol, Sweden, assignor to Aktiebolaget Tudor, Sundbyberg, Sweden

Continuation-in-part of Ser. No. 751,885, Dec. 17, 1976, abandoned. This application Sep. 15, 1977, Ser. No. 833,688
Claims priority, application Sweden, Dec. 29, 1975, 7514663
Int. Cl.[2] H01M 4/56
U.S. Cl. 429—217 8 Claims

1. A method for the production of a plate-type electrode for a lead storage battery comprising forming a mixture of lead powder which normally is at least 70% oxidized and from 0.1 to 3 percent by weight of polytetrafluoroethylene, heating the mixture, applying shear stresses to said powder mixture sufficient to convert substantially all of the polytetrafluoroethylene into fibrous form and applying the heated mixture to an electrode grid under conditions whereby a unitary, coherent structure is formed.

## 4,110,520
## MODIFICATION OF WATER-SOLUBLE ACRYLIC POLYMER

**Tohru Miyajima, Ebina, Japan, assignor to Kyoritsu Yuki Co., Ltd. and Mitsubishi Chemical Industries Limited, both of Tokyo, Japan**

**Filed Dec. 17, 1976, Ser. No. 751,671**
**Int. Cl.² C08F *8/10, 8/12, 8/50, 8/34***
**U.S. Cl. 526—27** **12 Claims**

1. A process for the modification of a water-soluble high polymer, which comprises: dispersing at least one water-soluble high polymer selected from the group consisting of polyacrylamide, polymethacrylamide, copolymers composed mainly of acrylamide, and copolymers composed mainly of methacrylamide in an aqueous solution of a water-soluble salt, said salt selected from the group consisting of alkali metal and magnesium salts of dibasic and more basic inorganic acids, wherein the concentration of said salt in said aqueous solution is sufficient to prevent the elution of said polymer from said solution and is not less than 15 wt. % based on the amount of salt in water; and contacting said water-soluble high polymer dispersed in the aqueous solution with a modifier to modify said high polymer.

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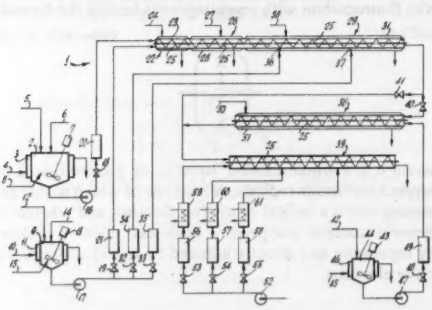
## 4,110,521
## CONTINUOUS POLYMERIZATION APPARATUS AND PROCESS

**Richard Earl Barnett, Pittsburgh, Pa., and Guy Thomas Woodrum, Blacksburg, Va., assignors to Calgon Corporation, Pittsburgh, Pa.**

**Filed Sep. 21, 1977, Ser. No. 835,091**
**Int. Cl.² C08F *2/10***
**U.S. Cl. 526—64** **7 Claims**



1. A device for the production of water soluble polymers which comprises a tubular premixer which is surrounded by a jacket in which a heated or cooled fluid is circulated to control the temperature of fluids being passed through the premixer, means to feed a monomer solution to the premixer, means to feed an initiator solution to the premixer, static mixers disposed inside the tubular premixer to provide thorough mixing of the monomer solution and the initiator solution, a tubular preheater into which the monomer-initiator mixture is passed said tubular preheater being surrounded by a jacket in which a heated fluid is circulated to increase the temperature of the monomer-initiator mixture, static mixers disposed inside the tubular preheater to provide mixing for uniform heat transfer to the monomer-initiator mixture, a tubular polymerizer which contains static mixers and a jacket which surrounds the tubular polymerizer through which fluid is pumped to control the temperature of the monomer-initiator mixture being polymerized, and means to dispense the polymer solution from the tubular polymerizer.

## 4,110,522
## MANUFACTURE OF OLEFIN POLYMERS

**Hans Frielingsdorf, Bad Duerkheim; Wolfgang Gruber, Frankenthal, and Heinz Mueller-Tamm, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen am Rhein, Fed. Rep. of Germany**

**Filed Jan. 21, 1977, Ser. No. 761,258**
**Claims priority, application Fed. Rep. of Germany, Feb. 6, 1976, 2604550**
**Int. Cl.² C08F *4/02, 4/24, 10/00***
**U.S. Cl. 526—105** **7 Claims**

1. A process for the manufacture of an olefin polymer by polymerizing one or more α-monoolefins 2 to 8 carbon atoms at from 60° to 160° C. and an olefin pressure of from 0.5 to 40 bars, by means of a catalyst obtained from a silicate carrier (component a), an organo-metallic compound containing alkoxide groups (component b) and a chromium compound (component c), wherein the catalyst employed is obtained by

(1) first charging

(1.1) a finely divided xerogel (component a) which has a particle diameter of from 20 to 2,000 μm, a pore volume of from 0.7 to 2.6 $cm^3/g$ and a surface area of from 150 to 600 $m^2/g$, and which the formula

$$SiO_2 \cdot m\ Al_2O_3$$

where $m$ is a number from 0 to 2, with

(1.2) an aluminum compound containing alkoxide groups (component b) of the general formula

$$R'_p Al(OR'')_{3-p}$$

where R′ is alkyl of 1 to 8 carbon atoms, R″ is open-chain alkyl of 1 to 8 carbon atoms or cyclic alkyl of 5 to 8 carbon atoms and $p$ is a number from 0 to 2,

(2) then charging

(2.1) the product obtained from stage (1) with

(2.2) a chromium compound (component c), which compound is chromium trioxide or a chromium compound which is converted to chromium trioxide under the conditions of stage (3), by treatment with a solution of the chromium compound, with intimate mixing and evaporation of the solvent, and

(3) finally keeping the product, obtained from stage (2), in an anhydrous stream of gas, containing oxygen at a concentration of more than 10 percent by volume, for from 10 to 400 minutes at from 600° to 1,000° C., with the proviso that the catalyst contains from 0.1 to 10 parts by weight of component (b) (calculated as aluminum) and from 0.3 to 10 parts by weight of component (c) (calculated as chromium trioxide) per 100 parts by weight of component (a) (calculated as silicon dioxide).

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## 4,110,523
## MANUFACTURE OF HOMOPOLYMERS AND COPOLYMERS OF α-MONOOLEFINS

**Günther Schweier, Ludwigshafen; Erich Kolk, Bad Durkheim; Heinz Mueller-Tamm, Ludwigshafen; Hans Frielingsdorf, Bad Durkheim; Robert Bachl, Worms, and Wolfgang Gruber, Frankenthal, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany**

**Filed Jan. 27, 1977, Ser. No. 762,856**
**Claims priority, application Fed. Rep. of Germany, Feb. 3, 1976, 2603920**
**Int. Cl.² C08F *4/02, 10/02***
**U.S. Cl. 526—124** **14 Claims**

1. A process for the manufacture of a homopolymer or copolymer of one or more α-monoolefins of 2 to 6 carbon atoms by polymerizing the monomer or monomers at from 30 to 200° C and from 0.1 to 200 bars by means of a Ziegler catalyst system comprising

(1) a titanium-containing catalyst component and

(2) a metal compound of the general formula

$$Me\ A_{m-n}X_n$$

where Me is aluminum, magnesium or zinc, A is a hydrocarbon radical of 1 to 12 carbon atoms, X is chlorine, bromine, iodine or hydrogen, *m* is the valency of the metal Me and *n* is a number from 0 to m−1, with the proviso that the atomic ratio of titanium from catalyst component (1) to metal (Me) from catalyst component (2) is from 1:0.1 to 1:500, wherein the titanium-containing catalyst component (1) employed is the solid-phase product (IV) obtained by bringing into contact

(1.1) a finely divided, porous, inorganic oxidic material (I) which has a particle diameter of from 1 to 1,000 μm, a pore volume of from 0.3 to 3 $cm^3/g$, and a surface area of from 100 to 1,000 $m^2/g$, and which has the formula $SiO_2.aAl_2O_3$, where *a* is a number from 0 to 2, and

(1.2) a solution (II) obtained by bringing together

(IIa) 100 parts by weight of an alcohol of the general formula

Z—OH

where Z is a saturated hydrocarbon radical of 1 to 8 carbon atoms,

(IIb) from 0.01 to 6 parts by weight (calculated as titanium) of a titanium trihalide, where the halogen may be chlorine and/or bromine, and

(IIc) from 0.01 to 4 parts by weight (calculated as magnesium) of a magnesium compound which is soluble in the alcohol (IIa), to form a dispersion (III), with the proviso that the weight ratio of inorganic oxidic material (I) to titanium in the titanium trihalide (IIb) is from 1:0.01 to 1:0.2, and the weight ratio of inorganic oxidic material (I) to magnesium in the magnesium compound (IIc) is from 1:0.01 to 1:0.25, and the dispersion (III) is evaporated at below 200° C, and above the melting point of the alcohol (IIa) used, the evaporation being substantially complete in about 1 to 10 hours, until it reaches a dry consistency, i.e. until the solid-phase product (IV) is formed, any residual alcohol being left in said solid-phase product (IV).

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**4,110,524**

## DIRECT PRODUCTION OF POLYMORPH III OF ISOTACTIC POLYBUTENE-1

**Albert Frese, Marl, Germany, assignor to Chemische Werks Huls A.G., Marl, Germany**

**Continuation of Ser. No. 257,979, May 30, 1972, abandoned, and Ser. No. 799,972, Feb. 17, 1969, abandoned. This application Apr. 24, 1974, Ser. No. 464,186**

**Claims priority, application Fed. Rep. of Germany, Feb. 27, 1968, 1720442**

**Int. Cl.² C08F *2/06, 10/08***

**U.S. Cl. 526—158** **11 Claims**

1. A process for the direct production of polybutene-1 containing about 70 to 100% of modification III, 0 to 20% of modification II, and 0 to 15% of modification I, and having a bulk density of 180–240 g/l, said process comprising polymerizing butene-1 at a polymerization temperature of 140°–200° C in the liquid phase in an inert hydrocarbon diluent in the presence of a catalyst consisting essentially of: (a) a titanium trichloride selected from the group consisting of violet $TiCl_3$ and $TiCl_3$ . 1/3 $AlCl_3$, and (b) an alkyl aluminum compound selected from the group consisting of an alkyl aluminum halogenide, a trialkyl aluminum, and an alkyl aluminum hydride, the molar ratio of (a) to (b) being about 1 : 0.5 to 1 : 3, said polymerizing being conducted substantially entirely at said polymerization temperature for a sufficient time to produce said polybutene-1 having a molecular weight of 50,000 to 5,000,000 measured by reduced viscosities, and then precipitating said polybutene-1 from said liquid phase.

**4,110,525**

## POLYMERIZATION PROCESS

**Yves de Zarauz, Le Cendre, France, assignor to Compagnie Generale des Etablissements Michelin, Clermont-Ferrand, France**

**Division of Ser. No. 788,031, Apr. 15, 1977, and a continuation-in-part of Ser. No. 659,905, Feb. 20, 1976, abandoned. This application Apr. 29, 1977, Ser. No. 792,325**

**Claims priority, application France, Feb. 27, 1975, 75 06239**

**Int. Cl.² C08F *4/52, 4/54***

**U.S. Cl. 526—177** **8 Claims**

1. A process of producing homopolymers of conjugated dienes or copolymers of conjugated dienes with other conjugated dienes or with vinyl aromatic compounds to form elastomeric products which comprises reacting the monomers at a temperature between 50° C. and 120° C. in the presence of a catalytic system formed of the reaction product of

(a) an organometallic compound of a metal of Group IIIA of the Medeleev periodic table of elements having the formula $Me^1OMe^3R^1R^2$ in which $Me^1$ represents an alkali metal, $Me^3$ represents aluminum or boron, $R^1$ and $R^2$ represent an alkyl or aralkyl radical; with

(b) at least one electron-donor compound containing at least one hetero-atom formed of the reaction product of a protic polar compound with an alkali metal or with an alkaline earth metal.

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**4,110,526**

## METHOD FOR PRODUCTION OF CASTING SYRUPS

**Takaki Hamada; Hiroyuki Kanazawa, and Masataka Yanase, all of Niihama, Japan, assignors to Sumitomo Chemical Company, Limited, Japan**

**Filed Jan. 31, 1977, Ser. No. 764,021**

**Claims priority, application Japan, Feb. 6, 1976, 51-12713**

**Int. Cl.² C08F *20/14***

**U.S. Cl. 526—214** **9 Claims**

1. In the production of a casting syrup, useful in a continuous casting process for the production of cast plates, by partial polymerization of methyl methacrylate or a mixture thereof with at least one unsaturated vinyl compound copolymerizable therewith in an amount of less than 20% by weight based upon methyl methacrylate, the improvement which comprises conducting the partial polymerization in the presence of from about 0.005 to 1% by weight based on the total amount of the monomers of a thiodicarboxylic acid ester of the formula:

$$R_3OOCR_1—S—R_2COOR_4$$

wherein $R_1$ and $R_2$ are each an alkylene group having 1 to 6 carbon atoms and $R_3$ and $R_4$ are each an alkyl group having 1 to 24 carbon atoms as a stabilizer and using an azo compound as a polymerization initiator.

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**4,110,527**

## VINYL CHLORIDE POLYMERIZATION USING SELECTED AMOUNTS OF AIR, OXYGEN OR NITROGEN

**Edwin T. Chesler, Riverside, R.I.; Donald Goodman, Flemington, N.J., and Milton Lapkin, Barrington, R.I., assignors to Olin Corporation, New Haven, Conn.**

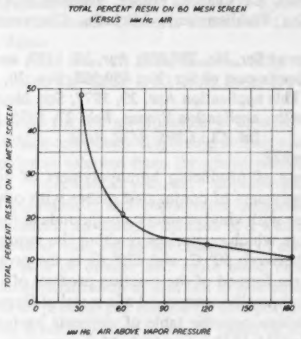
**Filed Apr. 30, 1973, Ser. No. 355,834**

**Int. Cl.² C08F *4/32, 4/28, 14/06***

**U.S. Cl. 526—235** **1 Claim**

1. In the method for preparing vinyl chloride polymers by suspension polymerization in which a vinyl chloride monomer is suspended in an aqueous medium which contains an initiator and a suspending agent, the improvement comprising maintaining a limited amount of oxygen gas in the reactor by placing

said reactor under an atmosphere of said gas of from about 60 to about 120 mm Hg of absolute pressure above the water


TOTAL PERCENT RESIN ON 60 MESH SCREEN VERSUS mm Hg. AIR
TOTAL PERCENT RESIN ON 60 MESH SCREEN
mm Hg. AIR ABOVE VAPOR PRESSURE

vapor pressure prior to charging the vinyl chloride monomer to the reactor.

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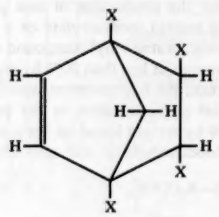
**4,110,528**

## RING-OPENED COPOLYMERS OF AT LEAST ONE NORBORNENE-TYPE MONOMER WITH DICYCLOPENTADIENE

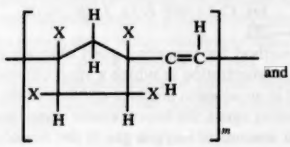
**Robert John Minchak, Parma Heights, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio**

**Continuation-in-part of Ser. No. 568,898, Apr. 17, 1975, Pat. No. 4,069,376. This application Mar. 28, 1977, Ser. No. 782,103**
**The portion of the term of this patent subsequent to Jan. 11, 1994, has been disclaimed.**
**Int. Cl.[2] C08F** *32/08, 232/08, 36/00*
**U.S. Cl. 526—283** **9 Claims**

1. A ring-opening polymerized copolymer comprising polymerized units derived from (a) at least one norbornene-type monomer having the formula



wherein any X may be hydrogen or an alkyl group containing from 1 to 20 carbon atoms, (b) dicyclopentadiene in an amount from about 40% to 95% by weight of the total weight of copolymer, and (c) from about 0.0001 to about 0.3 mole of at least one nonconjugated acyclic olefin per mole of total norbornene-type monomer and dicyclopentadiene, said acyclic olefin containing from 2 to 12 carbon atoms and having at least one hydrogen on each double-bonded carbon atom, said copolymer having repeating linkages primarily of the following types in random order, where *m* and *n* are numbers which are proportional to the concentrations of norbornene-type monomer and dicyclopentadiene used, and X is as defined heretofore:


and

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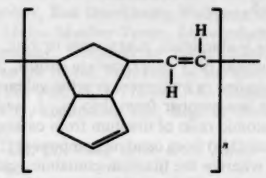

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**4,110,529**

## METHOD OF MANUFACTURING SPHERICAL POLYMER PARTICLES FROM POLYMER SOLUTIONS

**Vladimir Stoy, Prague, Czechoslovakia, assignor to Ceskoslovak akademie ved, Prague, Czechoslovakia**

**Filed Nov. 20, 1975, Ser. No. 633,787**
**Claims priority, application Czechoslovakia, Nov. 26, 1974, 8071/74**
**Int. Cl.[2] C08J** *3/16, 9/28*
**U.S. Cl. 528—491** **12 Claims**

1. A method of forming a polymeric material into spherical particles or beads, which comprises providing a solution of the polymeric material in a solvent that dissolves the polymeric material without any chemical transformation of the latter; dispersing the resulting polymeric material solution in a liquid dispersing medium that is a non-solvent for the polymeric material and is immiscible with the solvent, the volume ratio of the resulting dispersed phase to the dispersing medium varying from 1:1 to 30:1, the viscosity of the dispersing medium being no more than about one order less than the viscosity of the dispersed phase; adding the resulting emulsion with stirring into an excess of a coagulating liquid that coagulates the polymeric material without any chemical transformation of the latter and that is a non-solvent for the polymeric material, is miscible with the solvent, and is immiscible with the dispersing medium; whereupon the mixture is transformed directly into a three phase system of coagulated polymer, the coagulating liquid and the dispersing medium, and thereafter separating the liquid phases and resulting coagulated polymeric material particles or beads.

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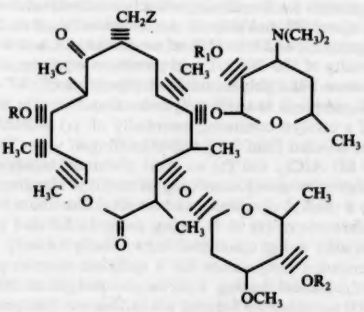
**4,110,530**

## SEMI-SYNTHETIC OLEANDOMYCIN DERIVATIVES - $C_8$ MODIFICATIONS

**Frank C. Sciavolino, East Lyme, Conn., assignor to Pfizer Inc., New York, N.Y.**

**Division of Ser. No. 712,360, Aug. 6, 1976, Pat. No. 4,036,853. This application Feb. 7, 1977, Ser. No. 766,219**
**Int. Cl.[2] A61K** *31/71;* **C07H** *17/08*
**U.S. Cl. 536—9** **3 Claims**

1. A compound of the structure:



and the pharmaceutically acceptable acid addition salts thereof wherein:

R is selected from the group consisting of hydrogen and n-alkanoyl having from two to three carbon atoms;

$R_1$ is selected from the group consisting of hydrogen and n-alkanoyl having from two to three carbon atoms;

$R_2$ is selected from the group consisting of hydrogen and n-alkanoyl having from two to three carbon atoms; and

Z is $-N_3$, —Cl and imidazol-1-yl.

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**4,110,531**

**SEMI-SYNTHETIC OLEANDOMYCIN DERIVATIVES - $C_8$ MODIFICATIONS**

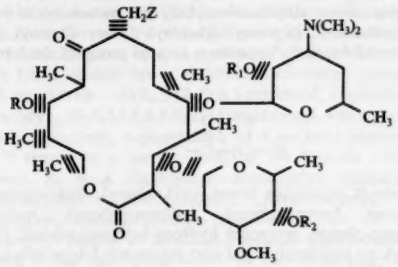
**Frank C. Sciavolino, East Lyme, Conn., assignor to Pfizer Inc., New York, N.Y.**

**Division of Ser. No. 712,360, Aug. 6, 1976, Pat. No. 4,036,853. This application Feb. 7, 1977, Ser. No. 766,260**

**Int. Cl.[2] A61K** *31/71;* **C07H** *17/08*

**U.S. Cl. 536—9** **4 Claims**

1. A compound of the structure:



and the pharmaceutically acceptable acid addition salts thereof wherein:

R is selected from the group consisting of hydrogen and n-alkanoyl having from two to three carbon atoms;

$R_1$ is selected from the group consisting of hydrogen and n-alkanoyl having from two to three carbon atoms;

$R_2$ is selected from the group consisting of hydrogen and n-alkanoyl having from two to three carbon atoms;

Z is selected from the group consisting of $-N{=}CHN(R_3)_2$, $-N(R_3)_2$ and $NH_2$ and;

$R_3$ is alkyl having from one to three carbon atoms.

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**4,110,532**

**5-HYDROXY-PGI$_1$ COMPOUNDS**

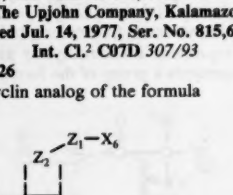
**Roy A. Johnson, and John C. Sih, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.**

**Filed Jul. 14, 1977, Ser. No. 815,648**

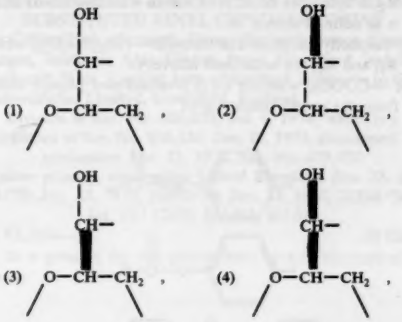
**Int. Cl.[2] C07D** *307/93*

**U.S. Cl. 542—426** **53 Claims**

1. A prostacyclin analog of the formula



wherein $Z_2$ is



wherein $Z_1$ is

(1) $-(CH_2)_g-CH_2-CH_2-$,

(2) $-(CH_2)_g-CH_2-CF_2-$, or

(3) trans$-(CH_2)_g-CH{=}CH-$,

wherein g is the integer one, 2, or 3;

wherein $R_8$ is hydrogen, hydroxy, or hydroxymethyl;

wherein $Y_1$ is

(1) trans—CH=CH—,

(2) cis—CH=CH—,

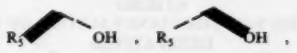
(3) $-CH_2CH_2-$,

(4) trans-CH=C(Hal)—, or

(5) —C≡C—

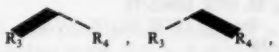
wherein Hal is chloro ol bromo;

wherein $M_1$ is

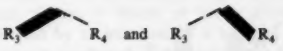


wherein $R_5$ is hydrogen or alkyl with one to 4 carbon atoms, inclusive;

wherein $L_1$ is



or a mixture of



wherein $R_3$ and $R_4$ are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of $R_3$ and $R_4$ is fluoro only when the other is hydrogen or fluoro;

wherein $X_6$ is

(1) $-COOR_1$; wherein $R_1$ is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation,

(2) $-CH_2OH$,

(3) $-CH_2NL_2L_3$, wherein $L_2$ and $L_3$ are hydrogen, alkyl of one to 4 carbon atoms, inclusive, or $-COOR_1$, wherein $R_1$ is as defined above;

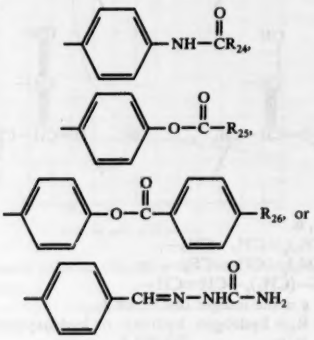
(4) $-COL_4$, wherein $L_4$ is

(a) amido of the formula $-NR_{21}R_{22}$, wherein $R_{21}$ and $R_{22}$ are hydrogen, alkyl of one to 12 carbon atoms, inclusive; aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, 2, or 3 chloro or alkyl of one to 3 carbon atoms, inclusive, or phenyl substituted with hydroxycarbonyl or alkoxycarbonyl of one to 4 carbon atoms, inclusive;

(b) carbonylamido of the formula $-NR_{23}COR_{21}$, wherein $R_{23}$ is hydrogen or alkyl of one to 4 carbon atoms and $R_{21}$ is as defined above; or

(c) sulphonylamide of the formula $-NR_{23}SO_2R_{21}$, wherein $R_{21}$ and $R_{23}$ are as defined above; or

(5) $-COOL_5$, wherein $L_5$ is p-substituted phenyl selected from the group consisting of



wherein $R_{24}$ is methyl, phenyl, acetamidophenyl, benzamidophenyl, or $-NH_2$; $R_{25}$ is methyl, phenyl, $-NH_2$, or methoxy; and $R_{26}$ is hydrogen or acetamido, and the 1,5— and 1,1 5-lactones thereof.

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**4,110,533**

## PROCESS FOR THE MANUFACTURE OF ENOL DERIVATIVES

**Robert Burns Woodward, Cambridge, Mass., and Hans Bickel, Binningen, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

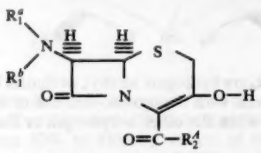
**Filed Feb. 10, 1976, Ser. No. 671,193**

**Claims priority, application Switzerland, Feb. 20, 1975, 2157/75; Aug. 25, 1975, 10962/75**

**Int. Cl.[2] C07D** *501/08, 501/20*

**U.S. Cl. 544—16** **12 Claims**

1. Process for the manufacture of a 7$\beta$-amino-3-cephem-3-ol-4-carboxylic acid compound of the formula



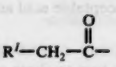
(IA)

wherein $R_1^a$ represents an acyl group of the formula

($A_1$),

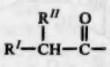
wherein $R^I$ represents hydrogen, cyclopentyl, cyclohexyl or cycloheptyl, or such cycloalkyl which is substituted in the 1-position by amino protected amino, sulphoamino or sulphoamino in the form of an alkali metal salt, or $R^I$ represents phenyl, naphthyl or tetrahydronaphthyl group or phenyl, naphthyl or tetrahydronaphthyl substituted by hydroxyl, protected hydroxyl, and/or by halogen

or $R^I$ represents 4-isoxazolyl, or $R^I$ represents an amino group which is N-substituted by lower alkyl or halogen substituted lower alkyl, or $R_1^a$ represents an acyl group of the formula



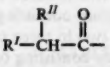
($A_2$),

wherein $R^I$ represents lower alkyl, halogeno-lower alkyl, phenyloxy-lower alkyl, hydroxyphenyloxy-lower alkyl, protected hydroxyphenyloxy-lower alkyl, halogeno-phenyloxy-lower alkyl, or lower alkyl substituted by amino and/or carboxyl, wherein amino is free or protected and carboxyl is free or protected, or $R^I$ represents lower alkenyl, phenyl, hydroxyphenyl, protected hydroxyphenyl, halogeno-phenyl, hydroxy-halogeno-phenyl, protected hydroxy-halogeno-phenyl, amino-lower alkyl-phenyl, protected amino-lower alkyl-phenyl, phenyloxyphenyl, or $R^I$ represents pyridyl, pyridinium, thienyl, furyl, imidazolyl or tetrazolyl, or these heterocyclic groups substituted by lower alkyl, amino, protected amino, aminomethyl or protected aminomethyl, or $R^I$ represents lower alkoxy, phenyloxy, hydroxy-phenyloxy, protected hydroxyphenyloxy, halogeno-phenyloxy, lower alkylthio, lower alkenylthio, phenylthio, pyridylthio, 2-imidazolythio, 1,2,4-triazol-3-ylthio, 1,3,4-triazol-2-ylthio, 1,2,4-thiadiazol-3-ylthio, 1,3,4-thiadiazol-2-ylthio, or 5-tetrazolylthio, and these heterocyclylthio groups, substituted by lower alkyl, or $R^I$ represents halogeno, lower alkoxycarbonyl, cyano, carbamoyl, N-lower alkyl-carbamoyl, N-phenylcarbamoyl, lower alkanoyl, benzoyl, or azido, or $R_1^a$ represents an acyl group of the formula



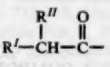
($A_3$),

wherein $R^I$ represents lower alkyl, phenyl, hydroxyphenyl, protected hydroxyphenyl, halogeno-phenyl, hydroxy-halogeno-phenyl, protected hydroxy-halogeno-phenyl, furyl, thienyl, or isothiazolyl, and also represents 1,4-cyclohexadienyl, and $R^{II}$ represents amino, protected amino, guanidinocarbonyl-amino, sulphoamino, sulphoamino in alkali-metal salt-form, azido, carboxyl, carboxyl in alkali-metal salt-form, protected carboxyl, cyano, sulpho, hydroxyl, protected hydroxyl, O-lower alkyl-phosphono, O,O'-di-lower alkyl-phosphono or halogeno or $R_1^a$ represents a group of the formula



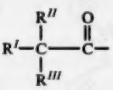
($A_4$),

wherein $R^I$ and $R^{II}$ each represent halogeno, or lower alkoxycarbonyl, or $R_1^a$ represents a group of the formula



($A_5$)

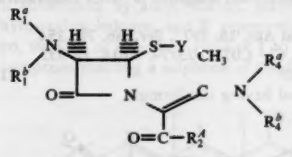
wherein $R^I$ represents phenyl, hydroxyphenyl, protected hydroxyphenyl, hydroxy-halogeno-phenyl, protected hydroxy-halogeno-phenyl, furyl, thienyl, isothiazolyl or 1,4-cyclohexadienyl, and $R^{II}$ represents aminomethyl or protected aminomethyl or $R_1^a$ represents a group of the formula



($A_6$),

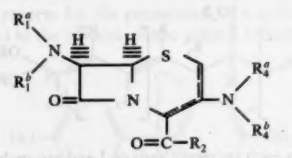
wherein each of the groups $R^I$, $R^{II}$ and $R^{III}$ represents lower alkyl, and $R_1^b$ represents hydrogen, or $R_1^a$ and $R_1^b$ together represent 1-oxo-3-aza-1,4-butylen, such group substituted in the 2-position by a group $R^I$ as defined under formula ($A_3$) and such group substituted in the 4-position by lower alkyl, and $R_2^A$ represents a group which together with the carbonyl

grouping —C(=O)— forms a protected esterified carboxyl group, characterised in that a compound of the formula



(II)

wherein $R_1^a$, $R_1^b$ and $R_2^A$ have the meanings mentioned under formula 1A, the group $—N(R_4^a)(R_4^b)$ denotes a secondary amino group, wherein one of the substituents $R_4^a$ and $R_4^b$ represents hydrogen and the other represents lower alkyl, lower alkoxy-lower alkyl, lower alkylthio-lower alkyl, cyclohexyl-lower alkyl, phenyl-lower alkyl, thienyl-lower alkyl, cycloalkyl with 3 to 7 carbon atoms, or such cycloalkyl substituted by lower alkyl, lower alkoxy, lower alkylthio, cyclohexyl, phenyl, or furyl, or wherein $—N(R_4^a)(R_4^b)$ denotes a tertiary amino group, wherein each of the substituents $R_4^a$ and $R_4^b$, independent of each other is lower alkyl, lower alkoxy-lower alkyl, lower alkylthio-lower alkyl, cyclohexyl-lower alkyl, phenyl-lower alkyl, thienyl-lower alkyl, cycloalkyl with 3 to 7 carbon atoms, or such cycloalkyl substituted by lower alkyl, lower alkoxy, lower alkylthio, cyclohexyl, phenyl, or furyl, or wherein $—N(R_4^a)(R_4^b)$ is 1-aziridinyl, 1-pyrrolidinyl, 1-piperidyl , 1H-2,3,4,5,6,7-hexahydroazepinyl, 4-morpholinyl, 4-thio-morpholinyl, 1-piperazinyl, or 4-methyl-1-piperazinyl, and Y represents a leaving group of the formula —S—$R_4$, wherein $R_4$ is a diazacyclyl, oxazacyclyl, thiazacyclyl, thiadiazacyclyl, Thiatriazacyclyl, oxadiazacyclyl, oxatriazacyclyl, benzdiazacyclyl, benzoxazacyclyl or benzthiazacyclyl radical of aromatic character which radical is bonded to the thio group —S— by one of its ring carbon atoms, which is bonded to a ring nitrogen atom by a double bond, or such group substituted by lower alkyl, lower alkoxy, halogen or phenyl, or wherein $R_4$ denotes lower alkanoyl, lower thioalkanoyl, cycloalkane carbonyl, cycloalkanethiocarbonyl, benzoyl, thiobenzoyl, naphthylcarbonyl, naphthylthiocarbonyl, pyridylcarbonyl, thenoyl, furoyl, pyridylthiocarbonyl, thiothenoyl or thiofuroyl, or represents such an acyl or thioacyl group which is monosubstituted or polysubstituted by lower alkyl, halogen, lower alkoxy, phenyl or phenyloxy, which groups $R_4$ have up to 18 carbon atoms, or Y represents a leaving group of the formula $—SO_2—R_5$, wherein $R_5$ represents unsubstituted or lower alkoxy-, halogeno, phenyl-, or phenyloxy-monosubstituted or -polysubstituted lower alkyl, lower alkenyl, cyclopentyl or cyclohexyl or $R_5$ represents naphthyl, or phenyl, or naphthyl or phenyl monosubstituted or polysubstituted by lower alkyl, lower alkoxy, halogen, phenyl, phenyloxy, or nitro, which groups $R_5$ have up to 18 carbon atoms, is heated in an inert solvent at a temperature of between about 80° to about 100°. H—Y being eliminated, and treating the enamine, which is formed as the intermediate product, of the formula (III)



(III)

in which the double bond can be in the 2,3-position or the 3,4-position, with water and a catalytic to equimolar amount of a carboxylic, sulphonic or mineral acid, at a temperature of −10° C to +40°C.

**4,110,534**

## PROCESS FOR THE PREPARATION OF 3-VINYL AND SUBSTITUTED VINYL CEPHALOSPORINS

**John Colin Clark, Gerrards Cross, England; James Kennedy, Angus, Scotland; Alan Gibson Long, Greenford, and Niall Galbraith Weir, London, both of England, assignors to Glaxo Laboratories Limited, Greenford, England**

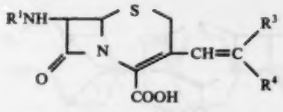
**Division of Ser. No. 486,633, Jul. 8, 1974, which is a continuation of Ser. No. 108,136, Jan. 20, 1971, abandoned. This application Apr. 21, 1976, Ser. No. 679,073**

**Claims priority, application United Kingdom, Jan. 23, 1970, 3464/70; Jan. 23, 1970, 21907/70; Jan. 23, 1970, 28194/70**

**Int. Cl.[2] C07D *501/02, 501/04***

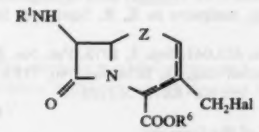
**U.S. Cl. 544—16** **10 Claims**

1. In a process for the preparation of a compound of the formula



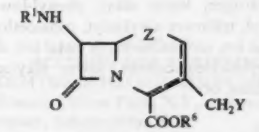
I

wherein $R^1$ is carboxylic acyl of from 1–20 carbon atoms and each of $R^3$ and $R^4$ is a member selected from the group consisting of a hydrogen atom; lower alkyl; cyclopentyl; cyclohexyl; phenyl; phenyl substituted by halogen, lower alkyl or nitro; lower alkoxycarbonyl; lower alkylcarbonyl; cyano; carboxy; phenylloweralkoxycarbonyl; diphenylloweralkoxycarbonyl; benzyl and phenylethyl, the steps of (A) reacting a cephalosporin of the formula



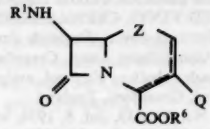
II

wherein $R^1$ has the above defined meaning, $R^6$ is hydrogen or a carboxyl-blocking group, Z is > S or > S → O, Hal is a chlorine, bromine or iodine atom, and the dotted line between positions 2, 3 and 4 represents a double bond at position 3, 4 or 2, 3 with a compound of the formula $PR_3$ or $P(OR)_3$ where R is lower alkyl, phenyl or benzyl or lower alkyl, phenyl or benzyl substituted by at least one of a halogen atom, nitro, cyano, or amino to produce a compound of the formula



III

wherein $R^1$, $R^6$, Z and dotted line are as defined above and Y is a group $—P^+R_3$ or $—PO(OR)_2$ where R is as defined above, (B) reacting the compound obtained in Step (A) with a base selected from the group consisting of an alkali metal of an alkaline earth hydroxide, carbonate, or hydrogen carbonate; ethoxycarbonylmethylenediphenylphosphorane; the conjugate base of dimethylsulphoxide, dimethylacetamide or dimethylformamide; pyridine; triethylamine; a sodio or lithio derivative of hexamethyldisilazane; an alkali metal alkoxide; ethylene oxide and propylene oxide to abstract therefrom a proton to produce a compound of the formula

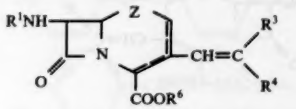


IV

where $R^1$, $R^6$, Z and the dotted line are as defined above and Q is a group $-CH{=}PR_3$ or $-\ominus CH-PO(OR)_2$ where R has the above defined meaning, and (C) reacting the compound obtained in step (B) with a carbonyl compound of the formula

$R^3.CO.R^4$

wherein $R^3$ and $R^4$ are as defined above to produce a compound of the formula



V

wherein $R^1$, Z, $R^3$, $R^4$, $R^6$ and the dotted line are as defined above.

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**4,110,535**

## 3-OXOPYRIDAZINYLTHIOMETHYL DERIVATIVES OF UREIDOCEPHALOSPORINS

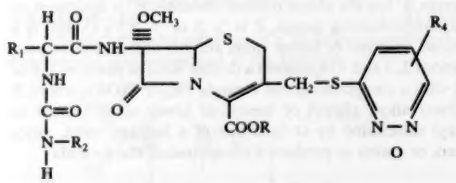
**Hermann Breuer, and Uwe Treuner, both of Regensburg, Fed. Rep. of Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Division of Ser. No. 611,041, Sep. 8, 1975, Pat. No. 3,996,218. This application Aug. 16, 1976, Ser. No. 715,018**

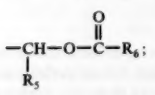
**Int. Cl.[2] C07D *501/36***

**U.S. Cl. 544—21** **12 Claims**

1. A compound of the formula:



wherein R is hydrogen, lower alkyl, phenyl-lower alkyl, diphenyllower alkyl, tri(lower alkyl)silyl, trihaloethyl, aluminum, an alkali metal ion, an alkaline earth metal ion, dibenzylamine, N,N-dibenzylethylenediamine, lower alkylamine, N-lower alkylpiperidines, or



$R_1$ is monosubstituted or unsubstituted heterocyclic wherein said substituent is Cl, Br, or lower alkyl of 1–4 carbons and said heterocyclic is attached by way of an available carbon atom and is selected from the group consisting of thienyl, furyl, and pyrryl; $R_2$ is hydrogen or lower alkyl; $R_4$ is hydrogen, halogen, lower alkyl of 1–4 carbons, or lower alkoxy of 1–4 carbons, $R_5$ is hydrogen or lower alkyl; and $R_6$ is lower alkyl, phenyl, or phenyl-lower alkyl.

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**4,110,536**

## DERIVATIVES OF 5-(INDOL-3-YL)HYDANTOIN

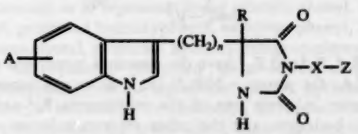
**Herbert J. Havera, Edwardsburg, Mich., and Wallace G. Strycker, Goshen, Ind., assignors to Miles Laboratories, Inc., Elkhart, Ind.**

**Filed Apr. 18, 1977, Ser. No. 788,154**

**Int. Cl.[2] C07D *413/14*; A61K *31/535***

**U.S. Cl. 544—139** **21 Claims**

1. A compound having the formula,



or a nontoxic, pharmacologically compatible salt thereof, in which:

A is a hydrogen atom, a halogeno, a hydroxyl, an alkyl, or an alkoxyl radical, the latter two of which contain 1–4 carbon atoms;

*n* is 0 or 1;

R is a hydrogen atom or a phenyl radical;

X is a methylene, ethylene, trimethylene, or 2-hydroxytrimethylene radical; and

Z is a morpholino, piperid-1-yl, 4-phenylpiperid-1-yl or 4-hydroxy-4-phenylpiperid-1-yl.

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**4,110,537**

## METHOD OF PRODUCING N[1]-(2-TETRAHYDROFURYL)-5-FLUOROURACIL

**Isao Minami, Suita; Yoshio Yoshioka, and Hiroaki Nomura, both of Takatsuki, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan**

**Filed Dec. 16, 1976, Ser. No. 751,541**

**Claims priority, application Japan, Dec. 25, 1975, 50-156800**

**Int. Cl.[2] C07D *405/04***

**U.S. Cl. 544—313** **9 Claims**

1. A method for producing $N^1$-(2-tetrahydrofuryl)-5-fluorouracil which comprises reacting a ratio of 1 mol of 5-fluorouracil with about 1.2 to 2.0 mols of 2,3-dihydrofuran in the presence of about 2 mols of trimethylsilyl chloride and about 1 mol of a tertiary amine in an aprotic anhydrous organic solvent, and treating the resultant mixture with an aqueous alkaline solution.

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**4,110,538**

## PROCESS FOR THE PREPARATION OF ACETAL SULPHONES

**Jean-Pierre Decor, Thurins, France, assignor to Rhone-Poulenc Industries, Paris, France**

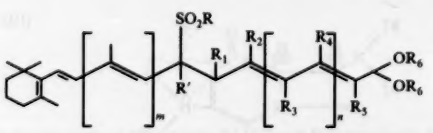
**Filed Feb. 23, 1977, Ser. No. 771,815**

**Claims priority, application France, Feb. 25, 1976, 76 05244**

**Int. Cl.[2] C07C *147/06***

**U.S. Cl. 560—11** **3 Claims**

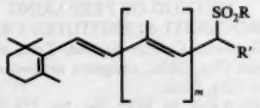
1. Process for the preparation of a sulphone of the formula:



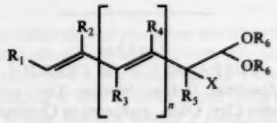
(I)

in which *m* and *n* each represent zero or 1 and are such that $m + n = 1$, $R_1$, $R_2$, $R_3$, $R_4$ and $R_5$, which may be identical or different, represent hydrogen or straight or branched alkyl radical of 1 to 6 carbon atoms, $R_6$ represents straight or branched alkyl of 1 to 6 carbon atoms, R represents straight or

branched alkyl of 1 to 6 carbon atoms or arylalkyl containing a straight or branched alkyl of from 1 to 6 carbon atoms or aryl, the aryl or the aryl moiety of the aralkyl being unsubstituted or substituted by alkyl, alkoxy, alkylthio, alkoxycarbonyl, hydroxyl or halogen, and R′ represents hydrogen or, if *m* is zero, straight or branched alkyl of 1 to 6 carbon atoms, which comprises reacting a sulphone of the formula:



in which R and R′ are as defined above and *m* is zero or 1, in a basic polar aprotic solvent and in the presence of a basic agent having sufficient activity to anionise the said sulphone, with an α-halogeno-acetal of an ethylenically unsaturated aldehyde of the formula:



in which $R_1$, $R_2$, $R_3$, $R_4$, $R_5$ and $R_6$ are as defined above, and *n* is zero or 1 and such that $m + n = 1$.

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**4,110,539**

## PROCESS FOR THE PREPARATION OF 2,2,4-TRIMETHYL-1,3-PENTANEDIOL DIISOBUTYRATE

**Kenneth H. Albers, Houston, and Howard N. Wright, Jr., Longview, both of Tex., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jul. 13, 1977, Ser. No. 815,135**

**Int. Cl.² C07C *67/24***

**U.S. Cl. 560—240** **11 Claims**

1. A process for the synthesis of 2,2,4-trimethyl-1,3-pentanediol diisobutyrate wherein a mixture of 2,4-diisopropyl-5,5-dimethylmetadioxane and isobutyric acid is reacted in the presence of a strong acid catalyst at a temperature of from about 80° C. to about 200° C.

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**4,110,540**

## PROCESS FOR THE PREPARATION OF MULTINUCLEAR PHENOLS WHICH ARE ALKYLATED IN THE NUCLEUS

**Dieter Freitag; Erhard Tresper; Rolf Kuchenmeister, and Wolfgang Beer, all of Krefeld, Germany, assignors to Bayer Aktiengesellschaft, Germany**

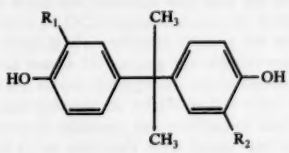
**Filed Jul. 27, 1976, Ser. No. 708,942**

**Claims priority, application Fed. Rep. of Germany, Aug. 2, 1975, 2534559**

**Int. Cl.² C07C *37/00, 37/14, 39/12, 39/16***

**U.S. Cl. 568—718** **12 Claims**

1. A process for the preparation of a multinuclear phenol alkylated in the nucleus, of the general formula I

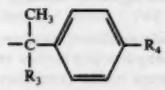


I

in which

$R_1$ and $R_2$ are different from each other and represent a hydrogen atom or a group of formula II or

$R_1$ and $R_2$ are equal and both represent a group of formula II

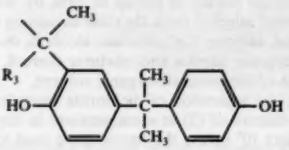


II

in which

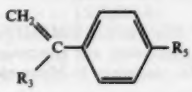
$R_3$ represents a hydrogen atom or a methyl group and

$R_4$ represents a hydrogen atom, an alkyl group or a group of formula III



III

in which $R_3$ has the meaning specified above or mixtures of the multinuclear phenols represented by the general formula I which may contain from 0 to 80% by weight of bisphenol A, wherein bisphenol A is reacted with a phenyl alkenyl compound of the formula IV



IV

in which

$R_3$ has the meaning specified above and

$R_5$ represents hydrogen, an alkyl group or a group of formula V

V

in which $R_3$ has the meaning specified above, in the presence of a catalytic quantity of aluminium phenolate.

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**4,110,541**

## METHOD FOR PURIFYING A DEHYDROCHLORINATION MIXTURE

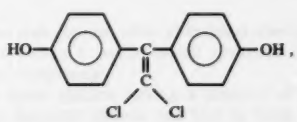
**Philip L. Kinson, Clifton Park, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Feb. 9, 1977, Ser. No. 767,046**

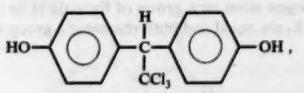
**Int. Cl.² C07C *37/24***

**U.S. Cl. 568—725** **8 Claims**

1. In a method for making a dichloride of the formula,



by the dehydrochlorination of a trichloride of the formula,



in a potassium hydroxide-methanol medium, whereby a contaminated dichloride dehydrochlorination reaction product is obtained, the improvement which comprises

(1) dissolving the contaminated dehydrochlorination reaction product of the trichloride in an aromatic organic solvent selected from the class consisting of xylene, toluene, benzene, chlorobenzene and mixtures thereof at a temperature of at least 70° C.,

(2) filtering the solution of (1),

(3) adding to the filtrate of (2) up to 25% by weight of a polar solvent, selected from the class consisting of methanol, ethanol, acetone, $C_{(3-8)}$ aliphatic alcohols, diols, water, aliphatic organic nitriles and mixtures thereof, based on the weight of the aromatic organic solvent,

(4) effecting the separation of dichloride crystals from the resulting mixture of (3) at a temperature in the range of from at least 10° below the temperature used to dissolve the dehydrochlorination reaction solids in step (1) to about 20° C.,

(5) collecting the resulting dichloride crystals formed in step (4) and

(6) drying the dichloride crystals at a temperature in the range of up to about 105° C.

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**4,110,542**

## PREPARATION OF DIHYDROXYDIPHENYL ALKANES

**James C. Drummond, Bridgeton, and Lawrence J. Hughes, St. Charles, both of Mo., assignors to Monsanto Company, St. Louis, Mo.**

**Filed Dec. 30, 1976, Ser. No. 755,706**
**Int. Cl.² C07C *37/18, 39/16***
**U.S. Cl. 568—729** **9 Claims**

1. The process for producing 4,4'-dihydroxydiphenylethane which comprises alkylating phenol with a 1,2-dihaloethane in which the halogen is chlorine, bromine, or iodine in at least the stoichiometric proportions of 2:1 in contact with a catalyst comprising lanthanum oxide supported on an inorganic material at a temperature from about 125° to about 225° C. in the presence of a hydrogen halide selected from the group consisting of hydrogen bromide and hydrogen iodide as promoter for the reaction.

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**4,110,543**

## METHOD OF PREPARING HYDROCARBYL-SUBSTITUTED CRESOLS

**Thomas E. Goodwin, College Station, Tex., and Charles M. Starks, Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.**

**Filed Feb. 24, 1977, Ser. No. 771,508**
**Int. Cl.² C07C *39/06***
**U.S. Cl. 568—781** **3 Claims**

1. A method for preparing a product containing predominantly m-cresol and thymol said method comprising heating, at a temperature in the range of about 200° to about 500° C., a mixture of di-t-butyl-m-cresol and isopropanol in the presence of a catalytic amount of activated alumina.

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**4,110,544**

## PREPARATION OF CRESOLS

**Thomas E. Goodwin, College Station, Tex., and Charles M. Starks, Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.**

**Filed Jan. 13, 1977, Ser. No. 758,980**
**Int. Cl.² C07C *37/00, 39/00***
**U.S. Cl. 568—805** **5 Claims**

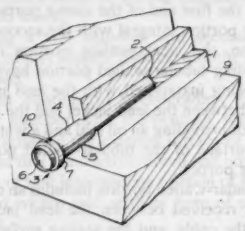
1. A process for preparing m-cresols from di-t-butyl-m-cresol, said process comprising (1) contacting the di-t-butyl-m-cresol with an effective amount of a catalyst, which is selected from the group consisting of activated alumina and synthetic silica-alumina, in liquid phase at a temperature in the range of about 200° to about 600° C., a pressure in the range of about 6 to about 70 atmospheres, a reaction time of about 1 to about 75 minutes and the amount of catalyst, as feedstock to catalyst, is in a LHSV range of about 0.05 to about 50, and (b) recovering the m-cresols from the reaction mixture by fractional distillation.

4,110,545

## ELECTRODES FOR GLASS FURNACES

Gordon Brian Shaw, Sheffield, and Richard John Brinkman, Wolverhampton, both of Great Britain, assignors to Pickford Holland & Company Limited, Sheffield, England

Filed Dec. 3, 1976, Ser. No. 747,177
Claims priority, application United Kingdom, Dec. 5, 1975, 50118/75
Int. Cl.[2] C03B 5/02; F27D 11/04
U.S. Cl. 13—6 11 Claims



1. A ceramic electrode comprising an electrode body having at least one longitudinal hole, an elongated, thin-walled hollow connector member of a noble metal having a cross-sectional shape corresponding to that of the hole and being a close fit in the hole, and a plug member having a cross-sectional shape corresponding to that of the connector member, and being a close fit within the connector member, the plug being formed from a material having subtantially the same expansion characteristics as the electrode material.

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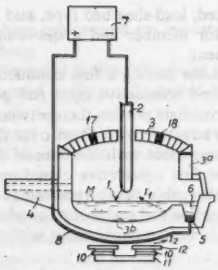
4,110,546

## DC ARC FURNACE HAVING A ROTATING ARC

Sven-Einar Stenkvist, Vesteras, Sweden, assignor to ASEA Aktiebolag, Vesteras, Sweden

Filed Nov. 5, 1976, Ser. No. 739,048
Claims priority, application Sweden, Nov. 6, 1975, 7512428
Int. Cl.[2] H05B 7/20
U.S. Cl. 13—11 2 Claims



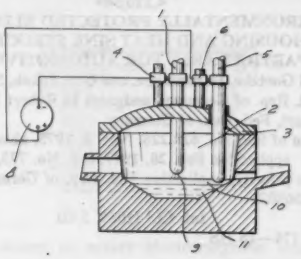
1. A DC electric arc furnace comprising a furnace enclosure having a hearth for containing a melt, an arcing electrode positioned in the enclosure above the melt and forming an arc therewith when the electrode and melt are placed in circuit with a source of DC, magnetic means for forming a rotating magnetic field in the enclosure causing the arc to rotatively deflect, and means for varying the rotative speed of said arc while the arc rotates through any one complete rotation so as to cause said speed to be relatively fast when said arc is deflected towards relatively hot portions of said enclosure and said speed to be relatively slow when said arc is deflected towards relatively cold portions of the enclosure.

4,110,547

## METHOD OF STEELMAKING WITH DIRECT CURRENT

Vassil Georgiev Peev; Alexander Yordanov Valchev, and Nikolay Georgiev Bakalov, all of Sofia, Bulgaria, assignors to DSO "Cherna Metalurgia", Sofia, Bulgaria

Filed Apr. 20, 1976, Ser. No. 678,664
Claims priority, application Bulgaria, Apr. 25, 1975, 29783
Int. Cl.[2] H05B 7/144, 7/20
U.S. Cl. 13—11 3 Claims



1. A steel-making method which comprises the steps of:
(a) introducing at least one charge of solid iron material into an electric arc furnace;
(b) engaging said charge with a contact electrode while advancing an arc electrode toward said charge and passing a direct electric current between said electrodes to generate an arc between said arcing electrode and said material to melt said material and forming a bath of molten material overlain by a slag layer;
(c) maintaining said contact electrode in engagement with said material during the arc melting thereof and at least until all of said material is melted;
(d) immersing said contact electrode only into said slag layer while spacing said contact electrode from the bath below said slag layer; and
(e) subjecting a molten material in said furnace to a further metallurgical process in the presence of an arc passing between said arcing electrode and said slag layer.

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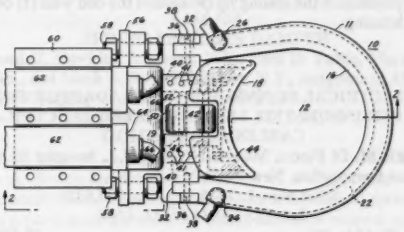
4,110,548

## WATER-COOLED ELECTRODE HOLDER

Charles D. Dresch, Annville, and Robert A. Yohe, Steelton, both of Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Dec. 29, 1976, Ser. No. 755,411
Int. Cl.[2] H05B 7/105
U.S. Cl. 13—16 2 Claims



1. In apparatus for use with cylindrical electric furnace electrodes including a water cooled electrode holder, the improvement comprising:
(a) a flat single element having a plurality of connected recesses machined therein and bent to form a U-shape metal sleeve having an opening forming an arc of more

than 180°, with the plurality of connected recesses provided in the outer wall of the metal sleeve,

(b) a pair of ports in the U-shaped metal sleeve leading to opposite ends of the connected recesses whereby a coolant may be circulated through the connected recesses, and

(c) means to seal the plurality of connected recesses against leakage.

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**4,110,549**

## ENVIRONMENTALLY PROTECTED ELECTRONIC HOUSING AND HEAT SINK STRUCTURE, PARTICULARLY FOR AUTOMOTIVE USE

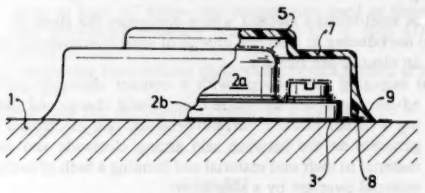
**Siegfried Goetzke, Hemmingen, and Gert Jakob, Stuttgart, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Division of Ser. No. 628,225, Nov. 3, 1975, abandoned. This application Feb. 28, 1977, Ser. No. 773,057**

**Claims priority, application Fed. Rep. of Germany, Nov. 30, 1974, 2456802**

**Int. Cl.² H05K** *5/03*

**U.S. Cl. 174—16 HS** **18 Claims**




1. Environmentally protected electronic housing structure comprising

a housing having an end wall (1) forming a heat sink;

a power semiconductor (2) secured to the housing end wall in good heat-conductive relation;

and protective means (5, 7) covering both said power semiconductor (2) and at least a portion of the housing end wall (1) surrounding the power semiconductor, and being dimensioned to offer little resistance to radiation of heat by said end wall, said protective means comprising

a cover cap or hood (7) covering the free surface of the housing (2) of the power semiconductor, the free surface of attachment means (3, 4) to attach the power semiconductor to the housing end wall (1) and the adjacent region of the housing end wall surrounding the power semiconductor, the cap or hood (7) being formed with a circumferential elastic sealing lip (9) and with an abutment shoulder (8) to limit engagement of the cap or hood towards the housing end wall, and to provide for resilient engagement pressure of the sealing lip (9) against the end wall (1) of the housing.

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**4,110,550**

## ELECTRICAL CONNECTOR WITH ADAPTOR FOR PAPER-INSULATED, LEAD-JACKETED ELECTRICAL CABLES AND METHOD

**Francis M. Di Pietro, Mountain Lakes, N.J., assignor to Amerace Corporation, New York, N.Y.**

**Filed Nov. 1, 1976, Ser. No. 737,421**

**Int. Cl.² H02G** *15/22, 1/14*

**U.S. Cl. 174—19** **28 Claims**

1. An adaptor for placement at the terminus of a high voltage electrical cable of the oil-filled type including a conductor, a paper insulator and a lead jacket, each having a terminal end adjacent the cable terminus, to seal the terminus and enable installation of an electrical connector of the type employing a pre-molded elastomeric component part for use in an electrical power distribution system, the adaptor comprising:

a sleeve portion of insulating material extending axially between a first end and a second end, the sleeve portion having an axially extending outer surface and an axially extending opening, said insulating material being essentially impervious to water and to the oil in the cable;

a conductor-sealing portion integral with the first end of the sleeve portion and sealing the opening in the sleeve portion adjacent the first end thereof, the conductor-sealing portion having an axially extending, electrically conductive sheath including an internal passage communicating with the opening in the sleeve portion, and a closed end remote from the first end of the sleeve portion;

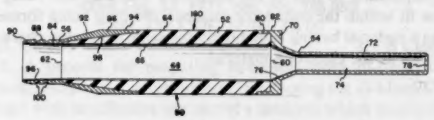
a jacket-sealing portion integral with the second end of the sleeve portion, the jacekt-sealing portion including an axially extending tubular-walled portion having a sealing surface for being juxtaposed with the lead jacket to seal the juncture between the lead jacket and the adaptor; and

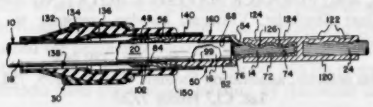
sealing means for providing an oil seal and a water seal along the sealing surface of the tubular-walled portion of the jacket-sealing portion,

wherein the tubular-walled portion includes an outer surface and is to be received between the lead jacket and the insulator of the cable, and the sealing surface is located upon the outer surface of the tubular-walled portion, and

wherein the sealing means includes a sealing member retained upon the sealing surface of the tubular-walled portion of the jacket-sealing portion.

21. An electrical connector kit for establishing a connection in the field at the terminus of a high voltage cable of the oil-





filled, paper-insulated, lead-sheathed type, said kit comprising a sleeve-like adaptor member and a sleeve-like elastomeric stress-grading element,

said adaptor member having a first conductive closed end portion, a second conductive open end portion, and an insulative intermediate portion therebetween, said adaptor member being adapted to be fitted over the terminus of said high voltage cable with the core of the cable being received in the first conductive closed end portion, the insulation of the cable being received in the insulative intermediate portion and said second conductive open end portion being in sealing engagement with the lead sheath of said cable,

said elastomeric stress-grading element having an opening at one end thereof extending interiorly of said element toward another end thereof to define a resilient bore of predetermined size sufficient to cause said element to tightly grip the exterior surface of said adaptor member when said stress grading element is fitted over said adaptor with said first conductive closed end and at least a portion of said intermediate portion being received within said resilient bore of said element.

27. A method of establishing a connection in the field at the terminus of a high voltage cable of the oil-filled, paper-insulated, lead-sheathed type, with the aid of a sleeve-like adaptor member and a sleeve-like elastomeric stress-grading element, said adaptor member having a first conductive closed end portion, a second conductive open end portion, and an

insulative intermediate portion therebetween, said elastomeric stress grading element having an opening at one end thereof extending interiorly of said element toward another end thereof to define a resilient bore of predetermined size, said method comprising the following steps: fitting said adaptor member over the terminus of said high-voltage cable with the core of the cable being received in the first conductive closed end portion, the insulation of the cable being received in the insulative intermediate portion, and the second conductive open end portion being in sealing engagement with the lead sheath of said cable,

establishing a seal between said second conductive end portion of said adaptor member and the lead sheath of said cable, and

fitting said elastomeric stress-grading element over said adaptor member with the resilient bore portion thereof tightly gripping the exterior surface of said adaptor, and with said first conductive closed end portion and at least a portion of said intermediate portion of said adaptor being received within said resilient bore of said stress-grading element.

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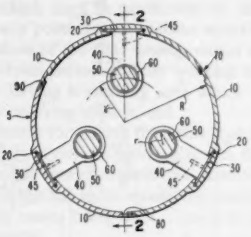
**4,110,551**

## EXTRUDED SHEATH SECTION FOR COMPRESSED GAS INSULATED TRANSMISSION LINES

**Alan H. Cookson, Southborough, Mass., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.**

**Filed Oct. 14, 1976, Ser. No. 732,227**
**Int. Cl.[2] H01B 9/06**
**U.S. Cl. 174—27** **18 Claims**



1. A three-phase compressed gas insulated transmission line system comprising:

a gas-tight elongated hollow aluminum sheath fabricated in three elongated sections and adapted to contain a pressurized gas;

three elongated conductors positionable longitudinally within said sheath, each conductor associated with a single sheath section;

a plurality of insulated spacers each associated with one of said sections, each said spacer having at an inner end a sleeve with conductor apertures to embrace and support one said conductor, and having an outer end for mounting to said associated elongated sheath section, said sheath section including a groove extruded longitudinally along the inner wall of said sheath section and adapted to receive said outer end of said speacers; and

a plurality of metal plates, mounted to each said spacer outer end and slidably mounted within said elongated groove for affixing said associated conductor at a preselected distance from said elongated section, said metal plates being further provided with a plurality of apertures of such size as to entrap conductive particles in the space between the underside of said plate and said groove;

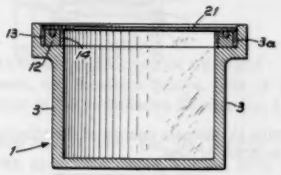
said spacers being mounted at selected longitudinal positions along said sheath and longitudinally separated from spacers mounted to adjacent sheath sections.

**4,110,552**

## ELECTRO/MECHANICAL ENCLOSURE WITH MAGNETIC COVER MEANS

**Anthony Joseph Lombardi, Flanders, N.J., assignor to International Telephone & Telegraph Corporation, Nutley, N.J.**

**Continuation of Ser. No. 593,581, Jul. 7, 1975, abandoned. This application Mar. 18, 1977, Ser. No. 779,195**
**Int. Cl.[2] H05K 5/04**
**U.S. Cl. 174—35 MS** **33 Claims**



1. An enclosure to ensure electromagnetic interference (EMI) and radio frequency interference (RFI) shielding for electronic components and/or protective shielding for mechanical components comprising:

a housing for said components having at least a bottom, side walls connected to said bottom in a shielding relationship to said components and at least a top opening opposite said bottom;

at least a top cover for said top opening;

first rigid continuous magnetic means completely surrounding said top opening and conforming to the configuration of said side walls to detachably secure at least said top cover to said side walls adjacent said top opening to close said top opening to complete said shielding of said components, said magnetic means having a north pole and a south pole disposed in the same plane as said top opening with one of said north and south poles being disposed adjacent the opening of said top opening and the other of said north and south poles being disposed remote from the opening of said top opening, said first magnetic means having disposed therein at least a first continuous recess coextensive therewith; and

a continuous non-magnetic, metallic mesh rope-like member disposed in and coextensive with said first recess, said rope-like member being compressed by the magnetic attraction of said top cover and said first magnetic means to provide an environmental seal for said top opening and to enhance said EMI and RFI shielding of said components.

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**4,110,553**

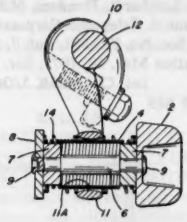
## SPRING FRICTION DAMPER

**Ronald G. Hawkins, Massena, N.Y.; Paul D. Tuttle, Marshall, Tex., and Mark A. Baker, Massena, N.Y., assignors to Aluminum Company of America, Pittsburgh, Pa.**

**Filed Jan. 17, 1977, Ser. No. 760,180**
**Int. Cl.[2] H02G 7/14**
**U.S. Cl. 174—42** **27 Claims**

1. A device for damping vibration of a single, suspended conductor, the device comprising at least one helical spring, at least a portion of the turns of which are close wound, means for attaching said spring to a suspended conductor in spaced relation thereto, and, at least one inertial weight connected to said spring and adapted to be resiliently suspended from a conductor by said spring and attaching means in spaced relation thereto, the inertial weight when suspended from the conductor being effective to relatively translate and thereby provide sliding friction between the close wound turns of the spring in a direction perpendicular to the longitudinal axis of

the spring when the conductor undergoes vibration above a given magnitude, the sliding friction of the turns of the spring



being effective to dissipate energy of the vibration of the conductor in the form of heat.

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**4,110,554**

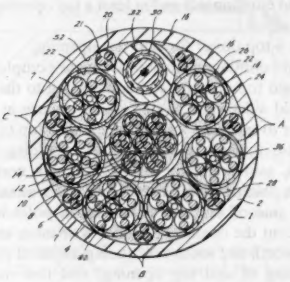
## BUOYANT TETHER CABLE

**Boyd B. Moore, and Clarence E. Kendall, Jr., both of Houston, Tex., assignors to Custom Cable Company, Houston, Tex.**

**Filed Feb. 8, 1978, Ser. No. 875,953**

**Int. Cl.[2] H01B 7/12, 11/18**

**U.S. Cl. 174—101.5** **14 Claims**



1. A high tensile strength electrically conductive buoyant tether cable comprising:

(a) a center stress core having,

(i) a plurality of cabled stress-bearing elements having a low density, high strength plastic-like jacket circumferentially defining each stress-bearing element;

(ii) a core tape binder circumferentially enclosing the plurality of inner stress-bearing elements (i);

(iii) a plurality of inner interstices formed by the exterior surfaces of the stress-bearing elements (i) and the core tape binder (ii); and

(iv) microspheres substantially occupying the plurality of inner interstices (iii);

(b) a plurality of conductor elements cabled around the center stress core (*a*) including:

(i) a first pair of conductor elements each composed of a plastic-like conductor core, a plurality of twisted insulated wires cabled around said plastic-like conductor core, a conductor tape binder enclosing the plurality of twisted pairs of wires whereby interstices are formed among the twisted pairs of wires, the plastic-like core and the plastic-like conductor tape binder, and a quantity of microspheres substantially occupying said interstices;

(ii) a second pair of conductor elements each substantially identical to the first pair of conductor elements (i);

(iii) a third pair of conductor elements each substantially identical to the first pair of conductor elements (i); and

(iv) a coaxial cable having a plastic-like external jacket circumferentially enclosing said coaxial cable;

(c) mid interstices formed by the center stress core (*a*) and the plurality of conductor elements (*b*), said mid interstices substantially filled with microspheres;

(d) an outer plastic-like tape binder circumferentially surrounding and in close proximity to the plurality of conductor elements (*b*) cabled around the core (*a*) such that outer interstices are formed between the conductor elements and the outer tape binder;

(e) at least one interstitial stress member located within and partially occupying each of the outer interstices (*d*);

(f) an outer jacket circumferentially surrounding the outer tape binder (*d*); and

(g) a quantity of microspheres occupying the volume of each outer interstices not occupied by an interstitial stress member (*e*) thereby forming a flexible, tensional load bearing, electrically conductive buoyant tether cable suitable for underwater operations.

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**4,110,555**

## CIRCUIT ARRANGEMENT FOR IDENTIFICATION AND ADDRESSING

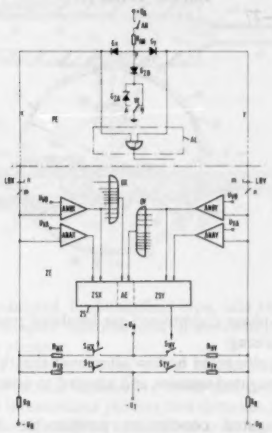
**Bernhard Heine, Leonberg; Wolfgang Arndt, Ludwigsburg, and Hartmut Löwer, Weissach, all of Germany, assignors to International Standard Electric Corporation, New York, N.Y.**

**Filed Apr. 28, 1977, Ser. No. 791,654**

**Claims priority, application Fed. Rep. of Germany, May 4, 1976, 2619608**

**Int. Cl.[2] H04Q 3/42**

**U.S. Cl. 178—3** **6 Claims**

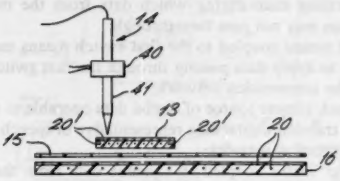


1. A circuit for detecting a change of condition at one of a plurality of units peripheral to a central control and for coupling said one unit to an output terminal, in which the units are arrayed in a coordinate matrix comprised of a first plurality of coordinate conductors coupled to respective coordinates of the matrix and a second plurality of coordinate conductors coupled to respective second coordinates of the matrix, means in one peripheral unit responsive to a change of condition therein for initiating marking potential to the coordinate conductors coupled to the one peripheral unit, said central control comprising a first sensing circuit common to conductors of said one coordinate, and a second sensing circuit common to conductors of said second coordinates, said sensing circuits individually responsive to marking potential to close a source of potential to the coordinate conductors of the one unit, a switching circuit in said one unit responsive to potential from said source over both of the coordinate conductors for switching said one unit through to an output terminal.

## 4,110,556
## GRAPHICAL INPUT DEVICES

**Peter Louis Hawkes, Harlow, England, assignor to National Research Development Corporation, London, England**

**Filed Mar. 28, 1977, Ser. No. 781,967**
**Claims priority, application United Kingdom, Apr. 2, 1976, 13521/76**
**Int. Cl.² G08C *21/00***
**U.S. Cl. 178—19** **22 Claims**




1. Apparatus for generating signals representative of the position of a point on a surface indicated by stylus means, including:

a member having a working surface suitable for use with stylus means to allow the stylus means to be used to indicate points in the working surface;

first sensing means for sensing the position of an indicating portion of the stylus means in relation to the working surface to sense the position of points therein indicated by the stylus means;

cursor means which may be positioned on the working surface over any point therein without materially affecting the operation of the first sensing means even when between the stylus means and the working surface, the cursor means having a working area which is small in relation to the working surface; and

second sensing means for sensing the position of the indicating portion of the stylus means in relation to the working area of the cursor means to sense the position of points therein indicated by the stylus means, the resolution of the second sensing means being high relative to that of the first sensing means.

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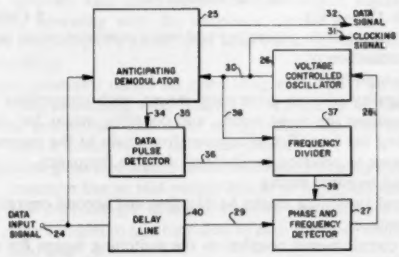
## 4,110,557
## PHASE LOCK OSCILLATOR FOR USE IN DATA PROCESSING SYSTEM

**W. Donald Huber, San Jose, Calif., assignor to Sperry Rand Corporation, New York, N.Y.**

**Filed Dec. 27, 1976, Ser. No. 754,849**
**Int. Cl.² H04L *7/02***
**U.S. Cl. 178—69.1** **7 Claims**




1. A system for generating clocking signal responsive in phase and frequency to a data signal having intermittent pulses indicating data, said system comprising:

an oscillator for providing a clocking signal responsive in frequency and phase to an error signal;

a phase and frequency detector for receiving and comparing the data signal pulses to said clocking signal for generating an error signal for regulating the oscillator so the phase and frequency of the clocking signal equals that of the data signal; and

means to prevent the transmission of the clocking signal to the phase and frequency detector when no data pulse exists in the data signal.

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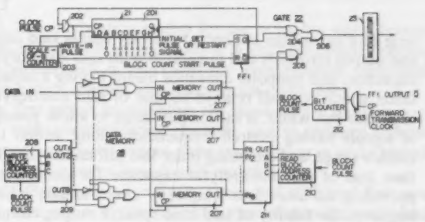
## 4,110,558
## DATA TRANSMISSION SYSTEM

**Satoshi Kageyama, and Kunihiko Sekiya, both of Yokohama, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan**

**Filed Jan. 31, 1977, Ser. No. 764,073**
**Claims priority, application Japan, Jan. 30, 1976, 51-8390**
**Int. Cl.² H04L *7/00***
**U.S. Cl. 178—69.1** **3 Claims**




1. A data-transmission system in which forward signals including synchronization codes and data blocks are transmitted from a transmitter to a receiver and backward signals including a synchronization code detection signal are transmitted from the receiver to the transmitter, both signals being carried through a transmission channel subject to variations in transmissions delay, the improvement comprising:

means for transmitting synchronization codes repeatedly at constant time interval from said transmitter to said receiver, until said transmitter detects a synchronization code detection signal from said receiver;

means responsive to detection of an error-free synchronization code at said receiver for transmitting a synchronization code detection signal from said receiver to said transmitter; and

means responsive to detection of the synchronization code detection signal at said transmitter for commencing data transmission to said receiver starting with the point of time at which the succeeding synchronization code is to be transmitted.

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## 4,110,559
## LOUD-SPEAKER OUTPUT CIRCUIT

**Kazuo Ishii, Tokyo, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan**

**Continuation of Ser. No. 629,223, Nov. 6, 1975, abandoned. This application May 6, 1977, Ser. No. 794,341**
**Claims priority, application Japan, Nov. 7, 1974, 49-127486**
**Int. Cl.² H03F *3/181***
**U.S. Cl. 179—1 D** **2 Claims**

1. A very low noise loud-speaker output circuit comprising:

a loud-speaker circuit means for driving a loud-speaker;

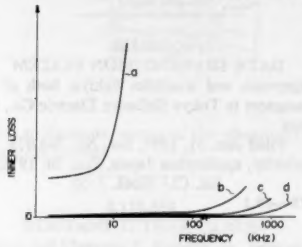
a transistor series circuit including at least one pair of series connected transistors connected in parallel to said loud-speaker circuit;

a sound signal source for delivering audio frequency signals to input electrodes of said transistors;

a bias circuit connected to said transistors;

at least one electrolytic capacitor having input and output terminals and connected between said transistor series circuit and a reference potential point, said electrolytic capacitor having a non-linear, frequency dependent inner loss characteristic whereby the fidelity of said loud-speaker output circuit is reduced in the audio frequency range; and,

nonpolar capacitor means taken from the group consisting of metallized paper, polyethylene terephthalate and polystyrene film capacitors connected directly across said input and output terminals and in parallel with said electrolytic capacitor, said nonpolar capacitor means having a capacitance which is small relative to that of said electrolytic capacitor but which is sufficiently large to allow passage of signals having desired frequencies falling within the audible range, and including inner loss sufficiently smaller than that of said electrolytic capacitor for collectively providing an inner loss frequency characteristic which improves the fidelity of said loud-speaker output circuit.

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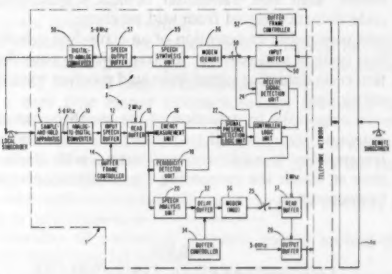
**4,110,560**

## COMMUNICATION APPARATUS

**Patrick John Leary, Waltham, and Harry Leonard Shaffer, Lynnfield, both of Mass., assignors to GTE Sylvania Incorporated, Stamford, Conn.**

**Filed Nov. 23, 1977, Ser. No. 854,463**
**Int. Cl.[2] H04M *1/00***
**U.S. Cl. 179—1 VC** **15 Claims**



1. Communication apparatus for bidirectional communication over a transmission network comprising:

a first, local source of digital data representative of speech;

real-time processing means coupled to the first source of data and operative to detect and examine in real time the data from the first source and to produce an output signal when the data is determined to represent voice data as opposed to noise;

modulator means;

speech analysis means coupled to the first source of digital data and operative to compress the data from the first source to a rate usable by the modulator means;

delay means coupled to the speech analysis means and to the modulator means and operative to delay the data from the speech analysis means by a predetermined amount and to apply the delayed data to the modulator means, the amount of the delay provided by the delay means being selected to compensate for delays inherent in the detection of data by the real-time processing means;

said modulator means being operable in response to the delayed data received thereby to match the data to the transmission network;

first switch means coupled to the modulator means and having a first operating state during which data from the modulator means may pass therethrough and a second operating state during which data from the modulator means may not pass therethrough;

output means coupled to the first switch means and operative to apply data passing through the first switch means to the transmission network;

a second, remote source of digital data operable to originate and transmit digital data representative of speech over the transmission network;

receiver means adapted to examine data from the second source and operative in the absence of digital data originating with the second source to produce an output signal;

controller means coupled to the real-time processing means, to the receiver means and to the first switch means and operative in response to the output signal produced by the real-time processing means and the output signal produced by the receiver means to cause the first switch means to operate in its first operating state thereby to allow data from the modulator means to be applied via the first switch means to the output means forapplication to the transmission network, said controller means being operative to cause the first switch means to operate in its first operating state for a period of time coincident with and also extending beyond the delay provided by the delay means by an additional amount, and further operative at the cessation of data from the first source and the termination of the output signal of the real-time processing means to cause the first switch means to switch to its second operating state at the termination of said period of time, the duration of said period of time being selected to prevent the first switch means from switching to its second operating state during a pause in the speech data from the first source.

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**4,110,561**

## COMMUNICATION UNIT FOR CODE GENERATION AND VOICE COMMUNICATION

**Joe F. Guess, Cedar Rapids, Iowa, assignor to Conrac Corporation, Stamford, Conn.**

**Filed Jul. 20, 1977, Ser. No. 817,266**
**Int. Cl.[2] H04M *1/50***
**U.S. Cl. 179—2 EA** **5 Claims**

1. In a tone code generating and voice communication unit, the combination of

a microphone,

a plurality of tone generating means, each comprising an amplifier, resonant means, and coupling means for coupling the amplifier in regenerative mode to the resonant means to produce oscillations of stable frequency,

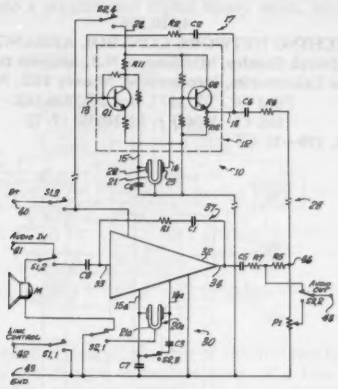
output terminal means,

manual switching means having first and second operating positions,

and circuit means coupled to the switching means for enabling the tone generating means and coupling the same to the output terminal means in response to one operating position of the switching means,

said circuit means being responsive to the other operating

position of the switching means for converting one of said amplifiers to stable operating mode and coupling the



converted amplifier between the microphone and the output terminal means.

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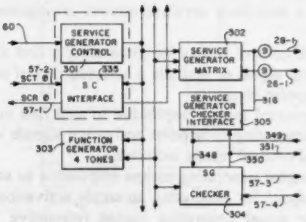
**4,110,562**

## SERVICE GENERATOR FOR GENERATING A PLURALITY OF TONES

**Johannes A. R. Moed, San Jose, Calif., assignor to TRW Inc., Los Angeles, Calif.**

**Filed Jan. 26, 1977, Ser. No. 762,810**
**Int. Cl.[2] H04J *3/12***
**U.S. Cl. 179—15 BY** **17 Claims**




1. In a telephone system having an interface including an input portion connected to an input bus for receiving input telephone signals, an output portion connected to an output bus for transmitting output telephone signals, and time slot interchanger means for connecting said input bus to said output bus whereby said input signals become output signals, said system operating with the telephone signals in time frames each consisting of a plurality of time slots, a service generator comprising:

tone generator means for generating, each time frame, pulse code modulated tone samples for a plurality of tones,

tone multiplexer means for multiplexing said tone samples onto a common bus each time frame,

service generator matrix means connected directly from said common bus to said output bus so as to bypass said time slot interchanger means to connect selected ones of said tone samples to said time slots in each frame on said output bus, and

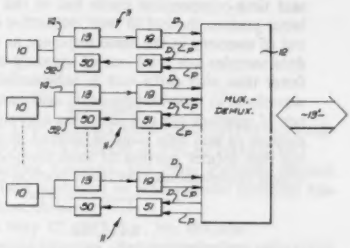
service generator control means, connected to control said matrix means, for specifying said selected ones of said tone samples and for specifying said selected time slots on said output bus.

**4,110,563**

## TRAFFIC SENSITIVE MODULATION SYSTEM

**Peter J. May, Yorba Linda, and Theodore M. Stump, Costa Mesa, both of Calif., assignors to The Anaconda Company, New York, N.Y.**

**Filed Mar. 21, 1977, Ser. No. 779,500**
**Int. Cl.[2] H04J *3/04***
**U.S. Cl. 179—15 BW** **11 Claims**




1. In a modulation system for use in analog signal transmission, in which input information in multiple analog communication channels is processed for asynchronous multiplexing onto a data channel, the combination comprising

a. first means for sampling the input analog signal in one of said communication channels, and to produce addressed asynchronous output pulse transmission in said channel in correspondence with said sampling, and

b. other means operatively connected with said first means to signal activation of pulse transmission for multiplexing onto the data channel only when the output of said first means is indicative of active transmission of information in the communication channel, whereby output pulse transmission derived from another communication channel may be multiplexed onto the data channel when there is an absence of information transmission in the one communication channel,

c. said first means including a delta modulator operable to transmit an alternating sequence of 1's and 0's during absence of information transmission in said one channel, and said other means includes logic circuitry means connected to the delta modulator to detect a successive sequence of at least two 1's or at least two 0's transmitted by the modulator as indicating said active transmission of information.

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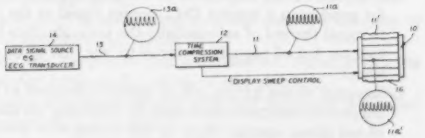
**4,110,564**

## TIME-COMPRESSION SYSTEM

**Richard Paul Andresen, Arlington, Mass., assignor to American Optical Corporation, Southbridge, Mass.**

**Filed Apr. 26, 1976, Ser. No. 679,963**
**Int. Cl.[2] G06F *3/14*; G11B *5/44*; H04N *1/22***
**U.S. Cl. 179—15.55 T** **9 Claims**




1. A system for the cyclical timecompression of a signal waveform comprising:

means for periodically sampling the signal waveform to provide sequential waveform data samples;

random access memory means having a predetermined plural number of storage locations, each said storage location

storing a respective said data sample for respectively differing periods of time unitl respective readout;

means for entering a plurality of said data samples sequentially into said memory at a first rate throughout a time-compression cycle of predetermined duration; and

means for interrogating said memory throughout only a predetermined latter portion of the duration of each time-compression cycle at a second uniform repetition rate having the same ratio to said first rate as the duration of said time-compression cycle has to the duration of said latter portion thereof to read respective said data samples out of memory in the same sequence as entered whereby data samples are read out of memory at a uniform rate faster than said entry rate to substantially represent said waveform in time-compression, said predetermined number of memory storage locations corresponding with the number of said data samples entered in said memory during that former portion of each time-compression cycle which complements said latter portion thereof.

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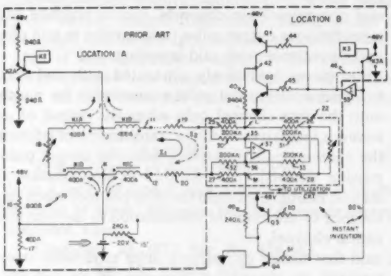
**4,110,565**

## DUPLEX TELEPHONE SIGNALLING SYSTEM

**Mauro Luigi Gaetano, Woodbridge, Va., assignor to Harvey Hubbell, Incorporated, Orange, Conn.**

**Filed Jul. 27, 1977, Ser. No. 819,434**
**Int. Cl.[2] H04M *7/02***
**U.S. Cl. 179—18 AH** **3 Claims**




1. A duplex telephone signalling system comprising:

plural conductors for both transmitting and receiving D.C. signals between two locations,

first and second devices each having a control input terminal and an output terminal, said devices producing signals at the output terminals thereof in response to control signals at the inputs thereof,

a switching device responsive to a change of state of telephone equipment at one location for producing the control signal for said first device,

said first device producing a first D.C. output signal of one polarity at the output terminal thereof in response to said control signal,

means coupling the control input terminal of said second device to said switching device for inverting the polarity of the control signal received by the inverting means,

said second device responsive to the inverted control signal for producing a second D.C. output signal at the output terminal thereof of substantially the same absolute magnitude as, but of opposite polarity to, the first D.C. output signal,

differential means having plural inputs connected to different ones of said two conductors for detecting the direction of net direct current flow in the conductors at the one location, said differential means producing D.C. outputs representing changes in current direction in said two conductors, and

first and second resistors of substantially equal resistance value for connecting each of the outputs of said first and second devices to a different one of the differential means inputs, whereby said differential means rejects said first and second output signals at the one location while such output signals are transmitted by said two conductors to another location.

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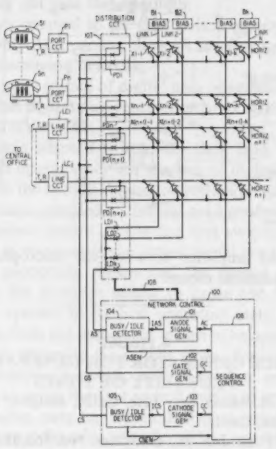
**4,110,566**

## SWITCHING NETWORK CONTROL ARRANGEMENT

**James Joseph Shanley, Middletown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Oct. 27, 1977, Ser. No. 846,162**
**Int. Cl.[2] H04Q *3/50*; H03K *17/72***
**U.S. Cl. 179—18 GF** **11 Claims**




1. In a telephone switching network comprising a plurality of thyristor crosspoint elements operation of each said thyristor crosspoint element has an anode, a cathode, and a gate terminal, a switching network control arrangement comprising:

network control means for generating a first and a second control signal to activate a selected one of said thyristor crosspoint elements;

signal control means responsive to said first control signal for generating crosspoint activation signals wherein said signal control means includes:

anode signal generating means responsive to said first control signal for generating an anode activation signal,

cathode signal generating means responsive to said first control signal for generating a cathode activation signal,

gate signal generating means responsive to said first control signal for generating a gate activation signal; and

distribution means responsive to said second control signal for switching said anode, cathode and gate activation signals to said selected thyristor crosspoint element.

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**4,110,567**

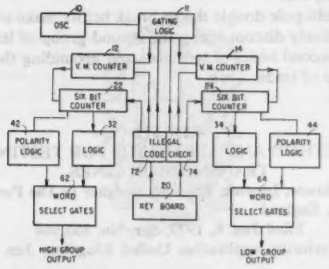
## MULTI-FREQUENCY GENERATOR USING DIGITAL TECHNIQUE

**Donald Joseph Boucher, Guelph, Canada, assignor to International Standard Electric Corporation, New York, N.Y.**

**Filed Mar. 14, 1977, Ser. No. 777,040**
**Int. Cl.[2] H04M *1/50***
**U.S. Cl. 179—84 VF** **10 Claims**

1. A telephone signaling circuit for generating an output tone frequency in response to selection of one of a plurality of signal controllers with each controller representing at least one tone frequency, said circuit including a base frequency generator, a variable modulo counter circuit for dividing the base frequency generated by a selected modulus responsive to the controller selected for emitting pulse signals, a further counter serially disposed to receive said pulse signals, said further

counter operative to divide the frequency of received pulses by a predetermined number for emitting a stream of pulses at a rate determined by said base frequency and said predetermined number, a programmable logic array for coding said pulses at said rate into a programmed digital binary word, said word




being comprised of binary digital bits of either of two types to approximate the changes in the sine curve of a tone signal being generated, said array normally biased to transmit one type of bit responsive to each successive pulse of said stream and transmitting the other type at predetermined locations in said word, responsive to a stored pattern within said array.

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**4,110,568**

## DUAL TONE MULTIFREQUENCY GENERATOR

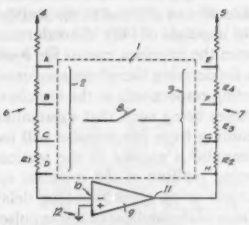
**Michael G. C. Taylor, Grobbendonk, Belgium, assignor to GTE ATEA, S.A., Herentals, Belgium**

**Filed Jul. 15, 1977, Ser. No. 816,121**

**Claims priority, application Belgium, Oct. 8, 1976, 55355**

**Int. Cl.[2] H04Q *9/12***

**U.S. Cl. 179—84 VF** **5 Claims**



1. A dual tone multifrequency generator for use in a telephone set, comprising:

a high gain differential amplifier having a noninverting input, an inverting input, and an output;

a source of reference ground potential connected to said noninverting input;

a first oscillator means connected to said inverting amplifier input via a first plurality of series connected frequency determining components, said oscillator generating a first output signal when a path to ground potential is established through said frequency determining components, and said first output signal having a frequency determined by the impedance from said first oscillator to ground potential;

a second oscillator means connected to said amplifier output via a second plurality of series connected frequency determining components, said oscillator generating a second output signal when a path to ground potential is established through said second plurality of frequency determining components, and said second output signal having a frequency determined by the impedance from said second oscillator to ground potential; and

a plurality of single-pole single-throw switches interconnecting said first and second plurality of frequency determining components such that when any particular switch is closed a unique feedback path is established from said amplifier output to said amplifier inverting input causing a ground potential to exist at said particular switch and thereby causing both first and second oscillators to operate.

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**4,110,569**

## METHOD AND APPARATUS FOR MONITORING THE ON/OFF-HOOK STATUS OF A TELEPHONE SET

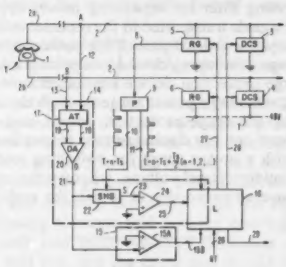
**Hans Rudolf Schindler, Langnau, and Peter Vettiger, Thalwil, both of Switzerland, assignors to International Business Machines Corporation, Armonk, N.J.**

**Filed May 27, 1977, Ser. No. 801,278**

**Claims priority, application Switzerland, Jun. 25, 1976, 8144/76**

**Int. Cl.[2] H04M *3/04***

**U.S. Cl. 179—84 A** **7 Claims**




1. A method for signalling the ON/OFF-HOOK status of a telephone set connected by a pair of extension wires to a telephone system during the time an AC ringing signal and a DC operating voltage are applied from sources thereof to the extension wires of said telephone set, said method comprising the steps of:

generating an AC signal having an instantaneous magnitude proportional to the difference between the instantaneous magnitude of the voltage on one of said extension wires with reference to one pole of said source of said DC operating voltage and the instantaneous magnitude of the voltage on the other of said extension wires with reference to said other pole of the source of said DC operating voltage;

using said ringing signal to control generation of a sequence of equidistantly spaced pulses at a frequency twice that of said ringing signal;

using alternative ones of said pulses to control a sampling of said generated AC signal;

storing said samples of said generated AC signal during the interval between the taking of said samples;

summing said stored sample with said generated AC signal to generate a sum signal;

comparing said sum signal with a reference value;

changing the magnitude of the DC voltage between said pair of extension wires when said telephone set goes OFF-HOOK; and

providing an OFF-HOOK detection signal if said sum signal exceeds said reference value at the time of occurrence of one of the remaining ones of said pulses.

**4,110,570**

## SURGE PROTECTION DEVICE FOR REPEATER

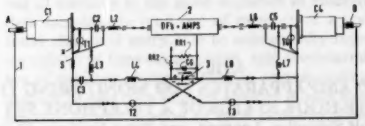
**Basil Bernard Foster, London, England, assignor to International Standard Electric Corporation, New York, N.Y.**

**Filed May 4, 1977, Ser. No. 793,675**

**Claims priority, application United Kingdom, May 25, 1976, 21637/76**

**Int. Cl.[2] H04B *3/44***

**U.S. Cl. 179—170 J** **5 Claims**



1. A repeater for a transmission system, the repeater comprising a signal transmission path and a separate d.c. power transmission path, an amplifier in said transmission path, a voltage-developing-device in the power transmission path for developing a unidirectional voltage to power the amplifier, a power separating filter for separating power applied to said repeater and signals transmitted to the repeater into the respective separate paths, at least part of the power separating filter and the voltage developing device comprising a series combination, a surge protection device connected across the series combination, whereby a power surge through the repeater will be carried by the surge protection device, and said device includes at least one gas discharge tube responsive to voltage associated with a power surge for switching said voltage to oppose said unidirectional voltage, whereby the unidirectional voltage is lowered to a value at which the amplifier will be switched off.

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**4,110,571**

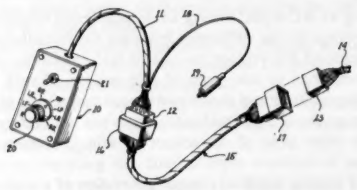
## TEST UNIT FOR STEREOPHONIC SPEAKER SYSTEMS

**Joseph F. Hills, Scottsdale, Ariz., assignor to Jimmy's Radio & Television Corporation, Phoenix, Ariz.**

**Filed Nov. 25, 1977, Ser. No. 854,761**

**Int. Cl.[2] H04R *29/00***

**U.S. Cl. 179—175.1 A** **10 Claims**



1. A test unit for providing an audible indication of both the existence and location of open and short circuit conditions within a multiple speaker system having a multi-terminal plug electrically connected to individual leads of first and second groups of leads extending from respective first and second sides of the coils of the speakers and including a power lead extending from a source of electrical power and a grounded lead, said test unit comprising in combination:

(a) a multi-position break before make switch, said multi-position switch including a center terminal, a first series of terminals, a second series of terminals and means for selectively electrically connecting said center terminal to any terminal of said first or second series of terminals;

(b) means for electrically connecting each terminal of said first series of terminals to one lead of the first group of leads and for electrically connecting each terminal of said second series of terminals to one lead of the second group of leads;

(c) means for interconnecting said center terminal with the power lead, said interconnecting means including a buzzer; and

(d) a multi-pole double throw break before make switch for selectively disconnecting the second group of leads from said second series of terminals and grounding the second group of leads.

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**4,110,572**

## METHOD AND APPARATUS FOR TESTING TRANSMISSION LINES

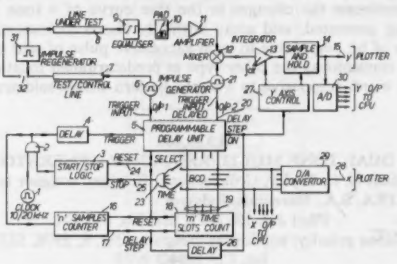
**Peter Cochrane, Ipswich, England, assignor to The Post Office, London, England**

**Filed Jun. 6, 1977, Ser. No. 803,964**

**Claims priority, application United Kingdom, Jun. 8, 1976, 23599/76**

**Int. Cl.[2] H04B *3/46***

**U.S. Cl. 179—175.3 R** **18 Claims**



7. Apparatus for testing a section of transmission line including means for connection to one end of the section for generating a succession of impulses of very short duration relative to the interval between the impulses, means for connection to an end of the section for deriving therefrom a succession of output signals corresponding respectively to the impulses, the interval between the impulses being such that substantially all of the output signals resulting from one impulse will have occurred before the next impulse is applied to the section of the line, means for producing replicas of the impulses applied to the section of line subject to an adjustable time delay, means for forming the products of the replicas of the impulses with corresponding output signals, means for integrating the products arising from a plurality of replicas subject to the same delay time to produce a smoothed correlation of the output signals with the delayed replicas of the impulses corresponding to each of a plurality of different time delays, and means for producing output indications representing the smoothed correlations.

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**4,110,573**

## SNAP ACTION SWITCH

**Scott S. Doi, Sidney, N.Y., assignor to The Bendix Corporation, Southfield, Mich.**

**Filed Aug. 30, 1976, Ser. No. 718,500**

**Int. Cl.[2] H01H *5/22***

**U.S. Cl. 200—67 DA** **10 Claims**

1. A snap action switch comprising:

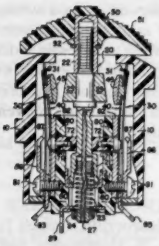
a housing having an upper end;

a shaft movably mounted within the housing;

a first contact mounted on said shaft;

a snap action blade mounted within said housing generally parallel to said shaft, said blade having an upper end that terminates in a latch that extends in the direction toward said shaft;

a leaf spring member mounted between said shaft and said snap action blade and generally parallel to said shaft and said blade, said leaf spring member having an upper end that includes a notch that mates with the latch on said blade;



a second contact mounted on said leaf spring member;

a button mounted at one end of said shaft, said button adapted to move said shaft in the direction of said leaf spring member and cause engagement of said first and second contacts.

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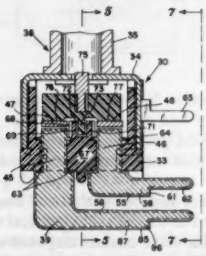
**4,110,574**

## SUB-MINIATURE, TWO POSITION DOUBLE POLE SWITCH

**Francis D. Kirchoff, Waban, Mass., assignor to Alco Electronic Products, Inc., North Andover, Mass.**

**Filed Mar. 30, 1977, Ser. No. 782,992**
**Int. Cl.[2] H01H** *13/28, 21/40*
**U.S. Cl. 200—67 G** **10 Claims**



1. A sub-miniature, two position, double pole switch of the type having a case with six projecting conductive terminals, a pair of spaced rockers and a handle with a spring pressed plunger and insulated tip for actuating the rockers characterized by:

an insulator member in the space between said rockers, within said case, said member having an elongated tongue groove extending in parallelism with said rockers and,

an elongated integral tongue on the insulated tip of said plunger, said torgue being slidably received in said tongue groove of said member during actuation of said rockers to prevent twisting of said rockers and uneven closing of the circuits to said terminals,

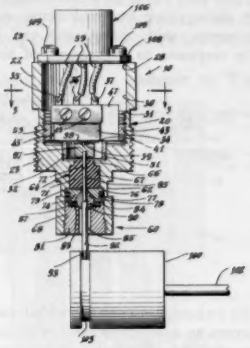
said insulator member forming a barrier between said double pole terminals and said rockers to prevent arcing therebetween.

**4,110,575**

## SPOOL DEFLECTION INDICATOR

**Daniel T. Meisenheimer, Jr., 404 Longmeadow Rd., Orange, Conn. 06477**

**Filed Jun. 28, 1976, Ser. No. 700,391**
**Int. Cl.[2] H01H** *35/00*
**U.S. Cl. 200—81.9 R** **13 Claims**



1. An indicator for sensing deflection of a spool or the like comprising:

(A) a housing adapted for mounting adjacent to a deflectable spool or the like, said housing defining an opening disposed toward the spool;

(B) signal producing means including an axially depressible actuating member thereof, said signal producing means mounted in said housing with the actuating member disposed toward said housing opening and said spool;

(C) a rod pivotally mounted at a point intermediate its ends and in said housing, one end of said rod extending from said housing through said housing opening for engagement with said spool whereby deflection of said spool pivots said rod, and the other end of said rod extending toward and generally aligned with the actuating member of said signal producing means; and

(D) a cam mounted on the end of said rod extending toward said actuating member of said signal producing means, said cam defining a cam surface which is positioned adjacent to and engages and acts on said actuating member of said signal producing means, whereby pivoting of said rod by deflection of said spool moves said cam surface with respect to said actuating member and causes said signal producing means to produce a signal in response to deflection of said spool.

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**4,110,576**

## PRESSURE RESPONSIVE SWITCH

**Richard T. Cusick, Laurel, and Wilbur J. Fleagle, Columbia, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Sep. 16, 1977, Ser. No. 833,799**
**Int. Cl.[2] H01H** *35/38*
**U.S. Cl. 200—82 E** **9 Claims**

1. A pressure responsive switch apparatus which is precluded from activation when a first source of pressure producing forces acting thereon is stabilized and which is activated when said first source of pressure produces a change of forces acting thereon followed by said first source of pressure and a second source of pressure producing forces acting on said apparatus in a preselected relationship, said apparatus comprising:

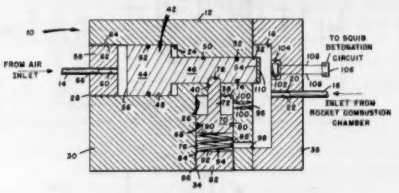
a housing having a chamber disposed therein, a first bore being disposed in said housing and communicating with said chamber, a second bore being disposed in said housing and communicating with said first bore;

a first elongated piston slidably disposed within said first bore, a first end of said first piston movable in said chamber;

a second elongated piston slidably disposed within said second bore;

means extendible into said first bore and responsive to movement of said second piston for positively engaging and locking said first piston in a preselected position;

means for disengaging and unlocking said engaging and locking means, said disengaging and unlocking means acting in response to movement of said second piston




caused by a change of pressure within said chamber delivered thereto by said first source of pressure;

switch means disposed within said housing adjacent to said first end of said first piston; and

means for urging said first piston from said preselected position to a position for activating said switch means responsive to said forces produced by said second source of pressure acting upon the second end of said first piston and said forces produced by said first source of pressure acting simultaneously upon said first end thereof in said preselected relationship.

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**4,110,577**

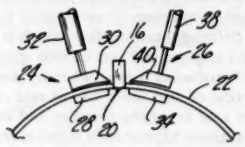
**WELDING MACHINE**

**Edward G. Spisak, 35700 Oakwood La., Westland, Mich. 48185**

**Continuation-in-part of Ser. No. 639,398, Dec. 10, 1975, abandoned. This application Feb. 14, 1977, Ser. No. 768,586**

**Int. Cl.[2] B23K** *11/08*

**U.S. Cl. 219—101** **14 Claims**




1. In a machine for welding adjoining workpiece portions together comprising; a gauge means movable between first and second positions, clamp means for each of said workpiece portions disposed at opposite sides of said gauge means and being operable to grip said portions and hold said portions in engagement with said gauge means when the latter is in said first position, means to move said clamp means toward each other when said gauge means is in its said second position to move said workpiece portions into abutting relationship to each other, a welding head movably supported for movement in close proximity to the abutting workpiece portions, means to move said welding head for welding said workpiece portions to each other to form a finished workpice, said clamp means being releasable from said workpiece portions and movable away from each other in response to movement of said welding head to a position completing the weld, said gauge means being movable to its first position and between said clamp means upon movement of said clamp means away from each other to engage said workpiece and eject it from said machine, said clamp means each comprising a support member and a clamp element movable relative to said support member, said clamp element and support member at one side of said gauge means being movable to grip one workpiece portion and being movable therewith as a unit relative to the other of said clamp elements, support members and workpiece portions upon movement of said gauge bar to said second position, said support member and clamp element at one side of said gauge means gripping one portion of said workpiece with a given force and the other of said clamp elements and support members gripping the other portion of said workpiece with a lesser force to permit sliding movement of said other portion in said clamp means when said portions are brought into abutting engagement with each other upon movement of said clamp means toward each other.

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**4,110,578**

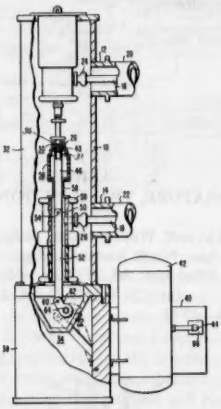
**CIRCUIT BREAKER**

**Willie B. Freeman, Monroeville; Russell N. Yeckley, Murrysville; Otto H. Soles, N. Huntingdon, and James M. Telford, Penn Hills, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Dec. 31, 1975, Ser. No. 645,867**

**Int. Cl.[2] H01H** *33/42*

**U.S. Cl. 200—148 F** **9 Claims**



1. A circuit breaker for use in compressed-gas insulated systems comprising:

an elongated sealed gas housing containing a compressed insulating gas and including two spaced-apart electrical conductors;

a stationary contact disposed within said housing and electrically connected to one of said electrical conductors;

a longitudinally movable contact disposed within said housing and electrically connected to the other of said electrical conductors, said movable contact capable of electrically contacting said stationary contact and capable of being spaced-apart from said stationary contact;

a contact rod secured at one end to said movable contact and having a free end;

guide means disposed within said housing and positioned adjacent to said contact rod, said guide means permitting said contact rod longitudinal movement;

a connecting rod pivotally coupled to said free end of said contact rod,

a rotatable positioning shaft having a pair of arms fixedly secured thereto and extending radially outwardly therefrom, said positioning shaft extending outwardly beyond said housing, said connecting rod being pivotally coupled to one of said arms;

a drive rod pivotally coupled at one end directly to one of said arms and having a free end;

a centrally rotatable drive latch having a first end section and a second end section, said drive rod free end being pivotally coupled directly to said first end section; and

means for rotating said drive latch comprising:

a sealed cylinder;

a rigid disc disposed within said cylinder and movable with respect thereto, said disc having a diameter substantially the same as said cylinder;

a latch rod secured to said disc and extending outwardly beyond said cylinder, said latch rod being secured directly to said drive latch second end section; and

means for inserting a driving fluid within said cylinder and against said disc, said driving fluid causing movement of said disc and said latch rod, movement of said latch rod causing rotation of said drive latch.

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**4,110,579**

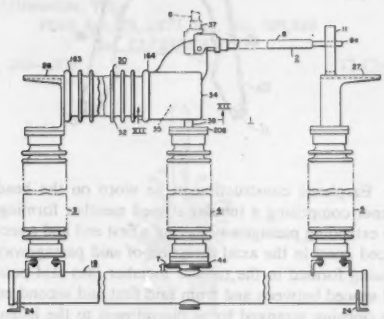
## IMPROVED ENERGY-STORAGE OPERATING MECHANISMS FOR CIRCUIT-INTERRUPTING STRUCTURES UTILIZING SERIALLY-RELATED DISCONNECTING SWITCH STRUCTURES THEREWITH

**Russell E. Frink, Pittsburgh, and Stanislaw A. Milianowicz, Monroeville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Division of Ser. No. 469,931, May 14, 1974. This application Mar. 4, 1975, Ser. No. 555,212**

**Int. Cl.[2] H01H *33/12, 33/14***

**U.S. Cl. 200—146 R** **30 Claims**



1. A circuit-interrupter and a serially-related disconnecting-switch structure, said circuit-interrupter including separable arcing contact means separable to establish arcing between the contacts, a common operating mechanism including a rotatable shaft for effecting the opening and closing movements of said separable arcing contact means and also said disconnecting-switch structure comprising additionally releasable closing energy-storing means, means for translating the rotative closing only during the closing operation of the circuit interrupter motion of said rotatable shaft into an increase of the energy-content stored within said closing energy-storing means during said closing operation, a toggle-linkage having a pair of interconnected toggle-links and a releasable knee-pin interconnecting said toggle-links, said toggle-linkage interconnecting said releasable closing energy-storing means with said separable arcing contact means, means for biasing the separable arcing contacts to the open-circuit position, first releasing means for said releasable knee-pin, tripping means responsive to reverse opening rotation of said shaft or effecting the release of said first releasing means to release the releasable knee-pin to thereby effect collapse of the toggle-linkage and thereby effect the opening of the separable arcing contacts, second releasing means for discharging the stored energy of said closing energy-storing means to effect the straightening of said toggle-linkage and consequent closing of the separable arcing contacts during the closing operation, means whereby the operation of said rotatable shaft-member additionally effects the closing and opening operations of said serially-related disconnecting-switch structure, and the separable arcing contacts remaining open in the fully-open-circuit position of the circuit-interrupter and disconnecting switch structure.

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**4,110,580**

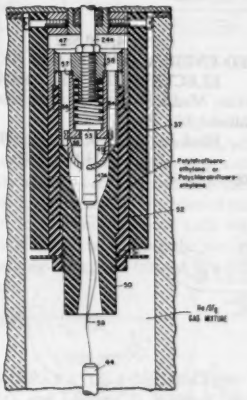
## GAS-TYPE CIRCUIT-INTERRUPTERS HAVING ADMIXTURES OF HELIUM WITH SMALL CONCENTRATIONS OF SULFUR-HEXAFLUORIDE ($SF_6$) GAS

**Owen Farish, Glasgow, Scotland, assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Aug. 30, 1976, Ser. No. 719,203**

**Int. Cl.[2] H01H *33/22***

**U.S. Cl. 200—148 G** **22 Claims**



1. A circuit-interrupter including as an arc-extinguishing medium an admixture of helium and sulfur-hexafluoride gases, the concentration of the sulfur-hexafluoride ($SF_6$) gas being in the order of one percent up to 10 percent, by volume.

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**4,110,581**

## DEVICE FOR MONITORING THE FITTING IN POSITION OF DETACHABLE ELEMENTS IN THEIR SUPPORT

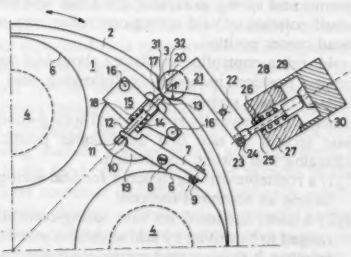
**Jacques Meunier, Paris, France, assignor to C.G.R. MeV, Paris, France**

**Filed Mar. 12, 1976, Ser. No. 666,266**

**Claims priority, application France, Mar. 14, 1975, 75 08074**

**Int. Cl.[2] H01H *3/42, 3/16***

**U.S. Cl. 200—153 LA** **10 Claims**



1. A device for monitoring the positioning of detachable elements in their mountings comprising

a mounting plate with *n* openings known as "locations", designed to receive said detachable elements,

said mounting plate being provided at its periphery with a thick rim provided with *n* slots and a safety system for monitoring the positioning of said elements, said safety system comprising *n* obturating-studs associated with said *n* slots;

means being provided to enable each of said obturating-studs to be retracted from its slot when the detachable element is appropriately positioned in its corresponding location;

said mounting plate being immobilizable in a given position by means of a safety locking system comprising an index which can be introduced into said slot corresponding to the selected location, after the retraction of said obturating-stud from said slot when said selected location is equipped with its detachable element;

means being provided for positioning said selected slot opposite said index, and said index actuating a safety electrical switch.

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**4,110,582**

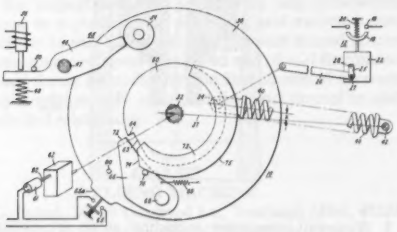
## STORED-ENERGY OPERATING DEVICE FOR AN ELECTRIC CIRCUIT BREAKER

**Philip Barkan, Media, Pa., assignor to General Electric Company, Philadelphia, Pa.**

**Filed Jul. 2, 1976, Ser. No. 702,328**

**Int. Cl.[2] H01H *3/00***

**U.S. Cl. 200—153 SC** **12 Claims**



1. In a stored-energy operating device,

(a) a spring,

(b) a rotatable spring-controller mounted for rotation between first and second angularly spaced dead-center positions with respect to said spring,

(c) means for transmitting charging forces to said spring in response to rotation of said spring-controller in a forward direction toward said first dead-center position,

(d) said spring acting to discharge and thereby further to rotate said spring-controller in a forward direction when said spring-controller has been rotated in a forward direction past said first dead-center position,

(e) releasable stop means coacting with said spring-controller for blocking said further forward rotation of said spring-controller, said stop means being releasable to permit said spring to rapidly discharge and continue forward rotation of said spring-controller into said second dead-center position,

(f) said spring-controller oscillating about said second dead-center position immediately following said rapid discharge of said spring,

(g) means for forwardly rotating said spring-controller from said second to said first dead-center position, thereby charging said spring, comprising:

(g1) a rotatable driving member for said spring-controller having an abutment thereon,

(g2) a pawl mounted on said spring-controller and arranged to be driven by said abutment when said driving member is driving said spring-controller in a forward direction toward said first dead-center position,

(h) and cam means effective after said spring-controller has passed in a forward direction through said first dead-center position but before said stop means has become effective to block forward rotational movement of said spring-controller for releasing said pawl from driven relationship with said abutment so that said driving member is not imparting driving force to said pawl when said stop is blocking said spring-controller,

(i) said cam means normally acting during the oscillations immediately following spring-discharge to hold said pawl out of a path that will permit a collision between said pawl and said abutment even if said spring -controller, in oscillating about said second dead-center position, should travel through as much as 90° in a reverse rotational direction from said second toward said first dead-center position.

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**4,110,583**

## EARPHONE CONSTRUCTION

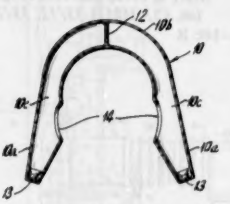
**Wilhelm Lepper, Berghaus Heckenfels, 5340 Bad Honnef a, Rhein, Fed. Rep. of Germany**

**Filed Feb. 3, 1976, Ser. No. 654,906**

**Claims priority, application Fed. Rep. of Germany, Feb. 3, 1975, 2504362; Feb. 4, 1975, 2504540; Feb. 19, 1975, 2507043; Mar. 11, 1975, 2510459; Mar. 25, 1975, 2513053; Apr. 9, 1975, 2515442**

**Int. Cl.[2] H04M *1/05;* H04R *5/00***

**U.S. Cl. 179—156 R** **25 Claims**



1. Earphone construction to be worn on the head of the listener comprising a tubular shaped member forming an axially extending passageway having a first end and a second end spaced apart in the axial direction of said passageway, a first opening formed in the tubular member into said passageway and spaced between and from said first and second ends, said first opening arranged to be placed next to the listener's ear, and a sound source located in said passageway and spaced in the axial direction thereof from said first opening, said sound source being positioned in said passageway for directing the sound in the general direction of the axis of the passageway so that the sound travels across said first opening into said passageway.

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**4,110,584**

## LOAD BREAK SWITCH WITH TRANSPARENT INTERNAL SHIELD

**John W. Erickson, and James A. Erickson, both of Crystal Lake, Ill., assignors to Boltswitch, Inc., Crystal Lake, Ill.**

**Continuation-in-part of Ser. No. 607,352, Aug. 25, 1975, Pat. No. 4,020,432. This application Feb. 14, 1977, Ser. No. 768,167**

**Int. Cl.[2] H01H *9/02, 13/04, 19/04, 21/04***

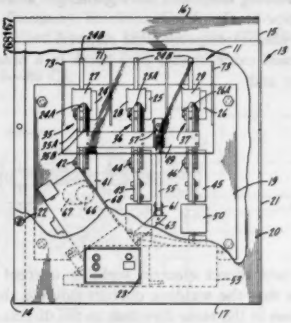
**U.S. Cl. 200—304** **3 Claims**

1. In a high-current, low-voltage load-break switch of the type which is installed in a housing having an access door,

said switch comprising a fixed contact, a movable contact movable between a closed position in bolted pressure contact with the fixed contact and an open position displaced from the fixed contact, and means for rapidly opening and closing the switch by driving the movable contact to its closed position and to its open position, and

a transparent shield supported in a fixed position across the front of the switch contacts in both their open and closed

positions to visually expose the switch contacts when the access door to the housing is open while providing protection in the event of electrical arcing and mechanical failure of the switch contacts.



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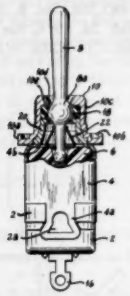
**4,110,585**

## GROUNDED LEVER TOGGLE SWITCH

**Harry W. Brown, Big Bend, Wis., assignor to Cutler-Hammer, Inc., Milwaukee, Wis.**

**Filed Apr. 21, 1977, Ser. No. 789,546**
**Int. Cl.² H01H *21/22***
**U.S. Cl. 200—305** **12 Claims**



1. An electric switch comprising:
a switch housing composed at least partly of metal having an opening therein and normally being grounded in use;
a switch operating mechanism within said housing;
a metal switch actuator extending out through said opening so as to be accessible for operation to actuate said operating mechanism;
means mounting said actuator to said housing to allow selective movement thereof to actuate said operating mechanism;
and means electrically connecting said actuator to the metal part of said housing to prevent electromagnetic radiation therefrom while allowing relatively unimpeded movement of said actuator comprising:
an electrically conductive grounding element in contact with the metal part of said housing and having an aperture through which said actuator extends and a pair of arms extending up from the outer edges of said grounding element and toward one another to resiliently grip said switch actuator therebetween for good electrical contact to electrically connect said actuator to said grounded metal part of said housing.

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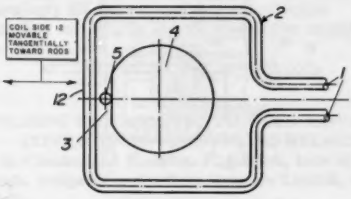
**4,110,586**

## MANUFACTURE OF DOPED SEMICONDUCTOR RODS

**Franz Köhl, Burghausen, Fed. Rep. of Germany, and Walter Hoch, Neukirchen, Enknach, Austria, assignors to Wacker-Chemitronic Gesellschaft für Elektronik-Grundstoffe mbH, Burghausen, Fed. Rep. of Germany**

**Filed Aug. 26, 1976, Ser. No. 717,959**
**Claims priority, application Fed. Rep. of Germany, Sep. 1, 1975, 2538812**
**Int. Cl.² H05B *5/08***
**U.S. Cl. 219—10.43** **11 Claims**




1. A process for doping a semiconductor rod, which comprises securing a semiconductor rod containing a dopant and having a substantially smaller cross-section than the rod to be doped against the rod to be doped with the axes of the two rods substantially parallel to one another, both rods consisting of the same semiconductor materials, fusing the two rods into a single rod, and subjecting the rod so formed to a crucible-free zone melting process.

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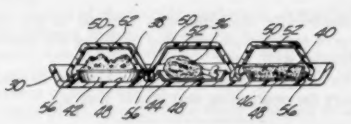
**4,110,587**

## METHOD AND APPARATUS FOR HEATING FOOD

**James J. Souder, Jr., and Lindsey E. Waldorf, both of Ann Arbor, Mich., assignors to Patents Licensing International, Ltd., Southfield, Mich.**

**Division of Ser. No. 560,396, Mar. 20, 1975, Pat. No. 4,020,310.**
**This application Jan. 10, 1977, Ser. No. 758,083**
**Int. Cl.² H05B *5/08***
**U.S. Cl. 219—10.49 R** **5 Claims**

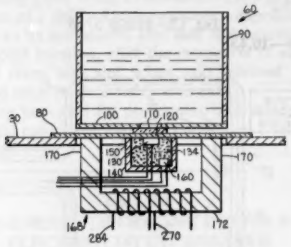


1. Apparatus for inductively heating a plurality of food portions to different temperatures comprising: a carrier having a plurality of food container receiving sections; a heating compartment with a planar surface adapted to be supported in alignment with the carrier and having a plurality of induction heating coils supported so as to be positioned in alignment with at least some of the plurality of food container receiving sections formed on the carrier; means for passing alternating electric currents through said induction heating coils; a plurality of food containers, each enclosing a food portion, the containers having surface configurations adapting them to be supported in the food container receiving sections of the carrier, each food container including an electrically conductive section whereby electric currents will be induced in the conducting sections to heat the food portions and means varying the heating response of at least some of said containers from one another to said alternating electric currents passed through said induction heating coils, whereby the amount of heat passed into a food portion within a particular food container when disposed on the carrier and in the compartment will vary between at least some of the containers.

## 4,110,588
## INDIRECT INDUCTION APPARATUS FOR HEATING FLUIDS

George E. Holz, 97 Grandview Ave., N. Plainfield, N.J. 07060

Filed Aug. 23, 1976, Ser. No. 716,954
Int. Cl.[2] H05B 5/04
U.S. Cl. 219—10.49 R 9 Claims




1. Fluid heating apparatus comprising
a housing having a top surface,
an aperture in said top surface,
an electrically insulating sheet covering said aperture and having a top surface and a bottom surface,
a container of a conductive material, filled with a thermally insulating material, secured to the bottom surface of said insulating sheet,
a first temperature sensor in said container and disposed adjacent to said insulating sheet,
a second ambient temperature sensor adjacent to the wall of said container, spaced from said first temperature sensor,
a U-shaped magnetic core having legs engaging the bottom surface of said insulating sheet with said container disposed between said legs,
electrical windings on said core for coupling to an oscillating power source,
a fluid-containing cup having a bottom wall which has at least one electrically conductive portion and which can be inductively heated and which is positioned over said magnetic core,
an aperture at about the center of said bottom wall of said cup,
a thin electrically insulating disk secured to the bottom surface of said bottom wall and covering the aperture in said bottom wall, and
means for coupling said temperature sensors to electrical circuitry for controlling said power source.

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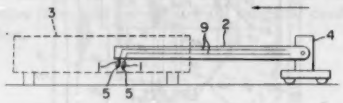
## 4,110,589
## METHOD FOR LONGITUDINALLY SEAM-WELDING PIPE-BLANK FOR WELDED STEEL PIPE FROM THE INSIDE ALONG A GROOVE

Fusao Koshiga, Kawasaki; Jinkichi Tanaka, Yokohama; Itaru Watanabe, Yokohama; Motoaki Suzuki, Yokohama; Toshifumi Kojima, Yokohama; Hiroyoshi Matsubara, Fukuyama; Tatsumi Osuka, Fukuyama; Kenji Takeshige, Fukuyama; Takashi Nagamine, Fukuyama, and Osamu Hirano, Fukuyama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 24, 1977, Ser. No. 771,841
Claims priority, application Japan, Mar. 24, 1976, 51-31392
Int. Cl.[2] B23K 9/08
U.S. Cl. 219—66 3 Claims

1. In a method for longitudinally seam welding a pipe-blank from the inside thereof using the reverse-polarity GMA welding process comprising: supplying direct electric current to a consumable welding electrode through a cable as the welding current, with said consumable electrode being maintained positive in polarity; and longitudinally seam-welding a pipe-blank for welded steel pipe from the inside along a cleft or groove by feeding said consumable electrode through a welding torch while moving a boom carrying said welding torch through said pipe-blank relative to said pipe-blank in the same direction as that of welding, said boom having a free end which carries said welding torch and having a length at least equal to that of said pipe-blank;
the improvement comprising the steps of:
arranging said cable in said pipe-blank in a predetermined direction; and




supplying said direct electric welding current in such a direction that the welding current flowing through said cable flows in the same direction as the direction of welding, thereby preventing occurrence of a magnetic arc blow of the welding arc from said consumable electrode toward the upstream side of the welding direction, i.e., in the opposite direction to that of welding.

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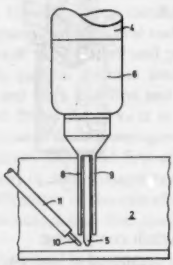
## 4,110,590
## INERT GAS WELDING

John Walter Batey, Chester-le-Street, and Anthony Charles Potter, Whitley Bay, both of England, assignors to Reyrolle Parsons Limited, England

Division of Ser. No. 487,208, Jul. 9, 1974, abandoned. This application Feb. 24, 1976, Ser. No. 660,921
Int. Cl.[2] B23K 9/16
U.S. Cl. 219—75 12 Claims

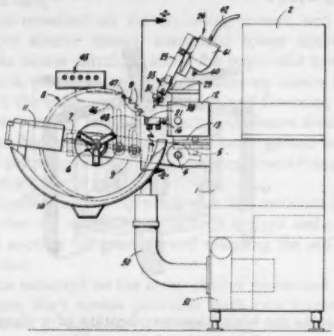



1. Welding apparatus for inert gas shielded arc welding comprising:
a non-consumable electrode having a longitudinal axis, a welding gun for holding and controlling said non-consumable electrode and including means for supplying inert gas to the welding arc region by way of a gas cup surrounding but spaced from such an electrode when positioned in the gun, the welding gun being further provided with an extended gas shielding wall arrangement having at least two end portions, each of said end portions having a longitudinal axis parallel with said electrode longitudinal axis, protruding a distance beyond the gas cup and capable, either by themselves or in combination with a narrow gap weld preparation, of substantially enclosing an electrode in the gun, except for its tip, when the electrode is protruding for a similar distance beyond the gas cup, said tip protruding through a plane which includes said end portions of said shielding wall.

## 4,110,591
## APPARATUS AND METHOD FOR BRAZING TIPS ON CIRCULAR SAW TEETH

Luigi Trinchera, Stockton, Calif., assignor to California Cedar Products Company, Stockton, Calif.

Filed Apr. 19, 1976, Ser. No. 678,160
Int. Cl.[2] B23K 1/04
U.S. Cl. 219—85 CA 9 Claims



1. An apparatus, for brazing a tip on a tooth of a circular saw blade, comprising, in connection with a supporting structure, a pair of opposed, initially spaced electrodes, means mounting the electrodes for approaching movement, means including an upwardly facing anvil to support and to pre-position an initially separate tip between the electrodes, means operative to cause such approaching movement of the electrodes whereby to clamp the anvil-supported prepositioned tip therebetween, a brazing paste applicator adapted to deliver brazing paste on the clamped-in-place tip, a switchcontrolled electrical resistance circuit connected to and including the electrodes, and a mount adapted to support a circular saw blade for movement to dispose a selected tooth in engagement from above with the clamped-in-place tip; said tip being resistance-heated, in response to closing of the circuit, to effect brazing of the tip on the tooth.

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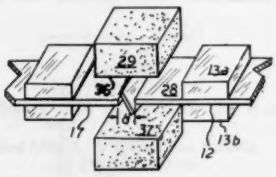
## 4,110,592
## METHOD OF SPLICING TAPE BY SOLDERING

Sigmund Ege, Oslo, Norway, assignor to Kløften & Kløften A/S, Oslo, Norway

Filed Jun. 3, 1976, Ser. No. 692,454
Int. Cl.[2] B23K 1/04
U.S. Cl. 219—85 M 10 Claims




1. The method of splicing comprising the steps of:

A. cutting substantially straight first and second edges respectively in first and second lengths of metallic tape, said second edge being substantially parallel to said first edge, said lengths being aligned,

B. positioning said first length and said second length of tape with their broad surfaces coplanar or in substantially parallel planes,

C. advancing at least one of said edges close to the other of said edges with no portion of either of said lengths overlapping any portion of the other of said lengths so as to leave a small gap in the lengthwise distance between said edges,

D. introducing a thin strip of silver solder through said gap between said edges, said strip having a width substantially exceeding the thickness of said tape, substantial portions of the width of said strip overlapping one surface of said first length and the opposite surface of said second length,

E. pressing said edges between substantially flat surfaces of processing means thereby pressing said strip against one surface of said first length and the opposite surface of said second length,

F. heating said strip sufficiently to cause silver solder to flowingly fill said gap and fuse to said edges.

G. cooling said lengths and the silver solder at said edges so as to butt splice said lengths.

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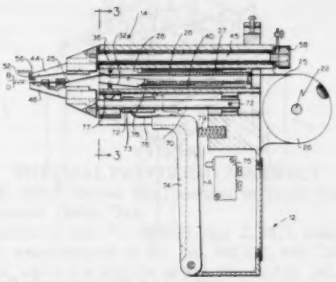
## 4,110,593
## WELDING GUN ADAPTED TO WELD MOVABLE CONTACTS ON WIRE SPRING RELAYS

Basil D. Crooks, and R. Brian P. Bennett, both of Toronto, Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Apr. 28, 1977, Ser. No. 791,861
Int. Cl.[2] B23K 11/10
U.S. Cl. 219—90 4 Claims



1. In a welding gun,

a casing,

a pair of jaws of electrically conducting, nonweldable material defining mutually facing surfaces,

means on one of said surfaces to seat a wire of a relay leaving a surface of the wire displaced therefrom toward the surface of the other jaw,

the other of said jaw surfaces being designed to seat a strip of material embodying the contact to be welded to said wire in a location to be clamped against said wire on the relative approach of said jaws,

one of said jaws being mounted on a jaw mounting member,

the other of said jaws being mounted for movement with said casing,

said one jaw mounting member being mounted on said casing to move in a direction to cause said one jaw to move between a position to clamp said wire against said contact material between the two jaws, and a position more widely spaced from the other jaw,

means releasably biassing said jaw mounting member toward the more spaced position,

a control member manually movable over a range of movement,

said control member and said jaw mounting member being arranged and directed so that on movement over said range in one direction said control member causes said jaw mounting member to move the jaw mounted thereon toward clamping relationship with the other jaw,

a spring connection between said control member and said jaw mounting member whereby on movement of said control member in said one direction said control member causes said jaw mounting member movement over said

spring until said clamping is achieved and thereafter movement of said control member a further distance in said one direction causes stress of said spring resulting in pressure of the jaw, which is mounted on the jaw mounting member, on the other jaw,

and a switch for electrically energizing said welding jaws located and designed to be actuated on movement of said control member over said further range of movement.

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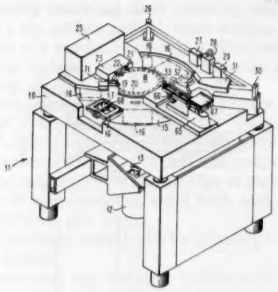
**4,110,594**

## PATTERN MASK GENERATING METHOD AND APPARATUS

**Gordon Herbert May, Morgan Hill, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 13, 1976, Ser. No. 750,292**
**Int. Cl.² G02F *1/29***
**U.S. Cl. 219—121 LM** **7 Claims**



1. A method for generating a set of photomasks for a multilayered integrated circuit, comprising the steps of:

supporting a plurality of substrates with photosensitive coatings on a turntable at substantially equal radial and circumferential distances relative to the axis of rotation;

rotating the turntable at substantially a preselected constant velocity;

providing an input medium having encoded indicia thereon representing that necessary to make all the masks for the different layers of the multilayered circuit;

directing a fine resolution energy medium toward the turntable and moving the medium incrementally in a radial direction relative to the turntable to scan successive contiguous bands of each substrate coating sequentially during successive rotations of the turntable;

modulating the fine resolution energy medium under control of the encoded indicia so as to control selective exposure of incremental portions of the coating on each substrate in a series of contiguous narrow scans as the energy medium is incremented radially relative to the rotating turntable, to provide a unique image pattern on each substrate corresponding to that required for a respective one of the masks necessary for fabricating a different layer of the multilayered integrated circuit, so that the masks for all requisite layers will be completely imaged substantially concurrently under identical environmental conditions and with minimal misregistration during a series of continuous successive rotations of the turntable; and

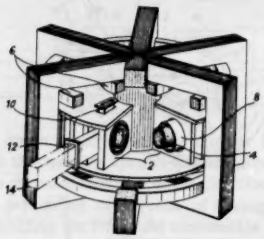
controlling the incremental radial movement of the medium and frequency of modulation with a continuous high frequency clocking system having a closed loop feedback.

**4,110,595**

## HIGH-FREQUENCY PLASMA-HEATING APPARATUS

**Marco Brambilla, St. Egreve, and Pascal Lallia, Grenoble, both of France, assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Jun. 19, 1975, Ser. No. 588,583**
**Int. Cl.² G21B *1/00***
**U.S. Cl. 219—121 P** **7 Claims**



1. Apparatus for high-frequency heating of a plasma confined by a magnetic field (B$\phi$) and traversed by a current (I $\phi$), characterized in that it comprises at least one array of adjacent wave guides opening into a vacuum chamber containing said plasma, means for exciting in each guide of said array a high-frequency wave so that the waves respectively propagate inside each guide and relative phase-shift producing means such that at least at and near the output end of said guides there is a phase shift between the waves in successive adjacent guides of said array, the phase shifts between successive pairs of guides together producing progressive steps of phase shift across a dimension of the array which is essentially parallel to the direction of said plasma-confining magnetic field where said guides open into said vacuum chamber.

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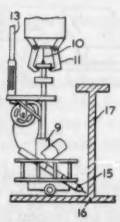
**4,110,596**

## APPARATUS FOR TRANSPORTING AND COLLECTING SELF-PROPELLED WELDING CARRIAGES

**Jiro Okamoto, Akashi; Mamoru Hirose, Ashiya; Katsuji Miyamoto, Jobe, and Shinichiro Kuroki, Kobe, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Continuation-in-part of Ser. No. 613,019, Sep. 12, 1975, abandoned. This application Jan. 7, 1977, Ser. No. 757,509**
**Claims priority, application Japan, Oct. 3, 1974, 49-11335**
**Int. Cl.² B23K *9/12***
**U.S. Cl. 219—124.4** **1 Claim**



1. Apparatus for welding upon material from above, at a work station having a plurality of longitudinally-spaced work sites, comprising:

at least one travelling means;

a travelling means support structure disposed over the work station and providing for longitudinal and transverse

movement of the travelling means in a horizontal plane over the work station;

at least one self-propelled welder that is separate from the travelling means, the self-propelled welder having structure providing the capability of rotating and travelling freely upon the material to be welded;

a control cable extending upwards from the self-propelled welder to the vicinity of the travelling means support structure;

a hoist mounted on the travelling means, and including upper sheave means, suspended lower sheave means, cable means entrained about the upper and lower sheave means, and cable payout and take-up means associated with the cable means for raising and lowering the lower sheave means relative to the upper sheave means;

at least one clamping means for clamping and holding the self-propelled welder, the clamping means being mounted on the lower sheave;

the clamping means including two legs associated with one another for movement relatively toward and away from one another for grasping and releasing the self-propelled welder;

a motor mounted on the lower sheave means and having an output shaft means provided with two screw-threaded sections of opposite-hand threading relative to one another;

each screw-threaded section being threaded to a respective clamp leg, so that operation of the motor in one sense moves both clamp legs to grasp the self-propelled welder and operation of the motor in another sense moves both clamp legs to release the self-propelled welder;

a limit switch mounted on the lower sheave means, the limit switch being disposed, when the clamping means is to grasp the self-propelled welder, for contact with the self-propelled welder when the limit switch becomes lowered with the lower sheave means until the limit switch is in operative contact with the self-propelled welder;

the limit switch being connected with the motor for activating the motor upon making said operative contact, to cause the clamp legs to grasp the self-propelled welder;

extensible, contractible anti-rotation means suspending the clamping means from the travelling means while permitting vertical movement of the clamping means due to operation of the hoist; and

swivelling means operatively interposed between the clamp legs and the travelling means support structure, the swivelling means having structure providing the capability of swivelling the self-propelled welder, while the self-propelled welder remains grasped by the clamping means, for untwisting the control cable when the same has become twisted due to net rotation of the self-propelled welder in one angular sense during self-propulsion thereof.

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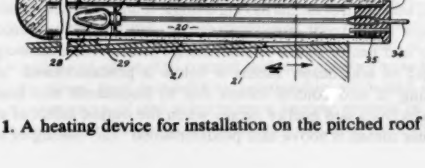
**4,110,597**

## HEATING DEVICE

**Theodore V. Elmore, 7570 Highway 65 NE., Fridley, Minn. 55432**

**Filed May 5, 1976, Ser. No. 683,462**
**Int. Cl.[2] H05B *1/00***
**U.S. Cl. 219—200** **16 Claims**




1. A heating device for installation on the pitched roof of a heated building to permit drainage of ice-blocked water from the roof of the building, comprising:

an elongate tubular housing defining a substantially closed chamber and having an end extendible over the roof edge of a building;

heating means located in the chamber;

a heat insulative jacket surrounding said housing to retard heat loss from the chamber;

said housing and jacket configured to be installable on a roof substantially parallel to the pitch thereof with a side of the housing in facing relationship to the surface of the roof;

means securing the housing to a roof with said side of the housing in facing relationship to the roof;

said jacket having a heat conductive channel on said side of the housing in facing relationship to said surface of the roof when the housing and jacket are installed on the roof substantially coextensive with the length of the housing and open through the jacket to the housing and to the roof for transfer of heat from the housing whereby heat generated by the heating means is transferred from the chamber toward the roof surface to form a heated passageway for drainage of water past an ice blockage.

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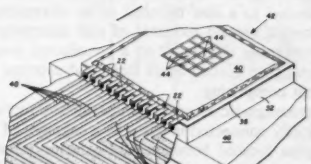
**4,110,598**

## THERMAL PRINTHEAD ASSEMBLY

**Richard B. Small, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Continuation of Ser. No. 609,655, Sep. 2, 1975, abandoned, which is a continuation of Ser. No. 363,432, May 24, 1973, abandoned, which is a division of Ser. No. 52,320, Jul. 6, 1970, Pat. No. 3,750,269. This application Apr. 21, 1977, Ser. No. 789,462**
**Int. Cl.[2] H05B *1/00***
**U.S. Cl. 219—216** **8 Claims**




1. A thermal printhead assembly comprising:

a semiconductor wafer having a plurality of semiconductor heater elements therein including bonding pads positioned on one side thereof,

a wafer receiving member secured to one surface of said semiconductor wafer; and

a plurality of heater element leads mounted between said semiconductor wafer and said wafer receiving member and extending outwardly therefrom, said heater element leads being connected to said bonding pads and terminating beyond the periphery of said semiconductor wafer providing means for connecting electrical conductors thereto.

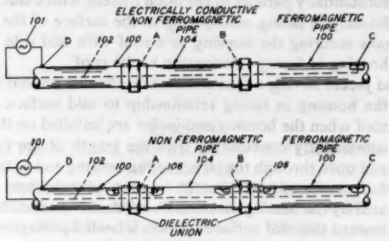
## 4,110,599
## METHOD AND MEANS FOR DECREASING THE HEAT OUTPUT OF A SEGMENT OF A HEAT GENERATING PIPE

**Paul F. Offermann, Redwood City, Calif., assignor to Chevron Research Company, San Francisco, Calif.**

**Continuation-in-part of Ser. No. 520,815, Nov. 4, 1974, abandoned. This application Feb. 5, 1976, Ser. No. 655,343**

**Int. Cl.[2] H05B** *3/00;* **F16L** *53/00*

**U.S. Cl. 219—301** **3 Claims**




1. A method for reducing the heat output of a segment of heat generating pipe, comprising the steps of:

electrically connecting one end of an insulated conductor means to a first terminal of an alternating current power source;

extending the opposite end of said insulated conductor means into a ferromagnetic pipe up to an extreme point of said ferromagnetic pipe where heat is desired and electrically connecting said opposite end to said pipe at said extreme point;

electrically connecting a second terminal of said power source to said pipe at a preselected point on said pipe spaced apart from said extreme point; and

electrically connecting in place of a segment of ferromagnetic pipe located between said extreme point and said preselected point an electrically conductive non-ferromagnetic section of pipe to reduce the magnetic field and head output produced within said segment of pipe.

2. In a system for reducing the heat output of a heat generation pipe, said heat generating pipe including a ferromagnetic pipe having an insulated electrical conductor means extending into said ferromagnetic pipe up to an extreme point of said ferromagnetic pipe where heat is desired, one end of said conductor means being connected to said ferromagnetic pipe at said extreme point, the other end of said conductor means being connected to a first terminal of an alternating current power source, a second terminal of said alternating current power source being connected to a preselected point on said ferromagnetic pipe spaced apart from said extreme point, the improvement comprising:

a non-ferromagnetic electrically conductive section of pipe electrically connected in place of a segment of ferromagnetic pipe located between said extreme point and said preselected point to reduce the magnetic field and heat output produced within said segment of pipe.

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## 4,110,600
## THERMOSTATICALLY CONTROLLED PLURAL HEAT OUTPUT PORTABLE ELECTRIC SPACE HEATER

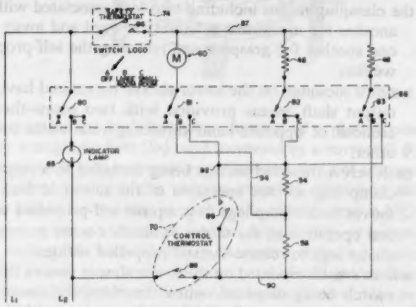
**Willard J. Spotts, Boonville, and Peter E. Huggler, Columbia, both of Mo., assignors to McGraw-Edison Company, Elgin, Ill.**

**Filed Jun. 24, 1976, Ser. No. 699,436**

**Int. Cl.[2] F24H** *3/04;* **H05B** *1/02*

**U.S. Cl. 219—364** **15 Claims**

1. A portable electric heater, comprising a case defining an enclosure having separated air flow openings adjacent the opposite upper and lower ends thereof, a support frame secured to the case inside the enclosure between the upper and lower openings, a motor powered fan assembly mounted on the support frame, heating element means mounted on the support frame between the upper and lower openings, a control switch having high heat and low heat operative settings, a thermostat for sensing ambient air passing through the heater enclosure and having a set of control contacts closed during a heat demand situation and opened during a heat satisfied situation, control circuit means including the control switch and the thermostat for connecting electrically the heating element means and fan assembly in selective modes of operation and operable in the high heat operation control switch setting and in a heat demand situation to connect the heating element means in a first predetermined operating mode for providing high heat output and to connect the fan assembly motor for high speed operation and in a heat satisfied situation to connect said heating element means in a second predetermined mode of operation for providing a generally lower heat output approximately 60-70% of said high heat output and to connect the fan assembly motor for operation at a slower speed, and the circuit means further being operable in the low heat operative control switch setting and in a heat demand situation to connect the




heating element means in said first predetermined mode of operation for providing said high heat output and to connect the fan assembly motor for high speed operation and operable in a heat satisfied situation to connect said heating element means in a third predetermined mode of operation for providing a substantially lower heat output, approximately 20 to 30% of said high heat output and to connect the fan assembly motor in a manner whereby said fan assembly is energized insufficiently for operation thereof, said fan assembly when operated, causing air to flow into the heater casing through the upper opening, over the energized heating element means and out the lower opening and when unoperated permitting a convective air flow only through the case enclosure from the lower opening, over the energized heating element means and out the upper opening.

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## 4,110,601
## CONTROL SYSTEM AND METHOD AND CONTROL DEVICE THEREFOR

**Cloyd E. Decker, Indiana, Pa., assignor to Robertshaw Controls Company, Richmond, Va.**

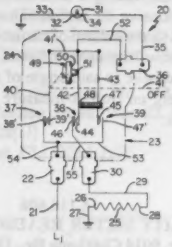
**Continuation of Ser. No. 550,456, Feb. 18, 1975, abandoned. This application May 9, 1977, Ser. No. 795,403**

**Int. Cl.[2] H05B** *1/02*

**U.S. Cl. 219—506** **17 Claims**

1. A control system comprising a source of energy means, heater means, indicator means, and thermostatically operated control means having selector means for setting said control means in a heater means non-temperature producing "off" setting or in a heater means temperature producing "on" setting, said control means having a single temperature responsive device operatively interconnected to said means to interconnect said heater means to said energy means when the output effect of said heater means is below a predetermined "on" setting of said control means and to disconnect said heater means from said energy means when the output effect of said heater means is above said predetermined "on" setting of said

control means, said single temperature responsive device of said control means operating said indicating means to indicate



that the output effect of said heater means is above a certain value when said control means is in said "off" setting thereof.

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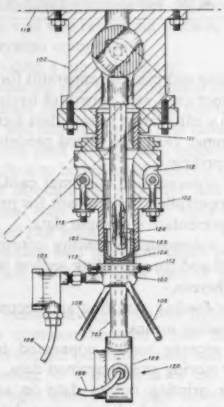
**4,110,602**

## METHOD AND APPARATUS FOR FREEING A RAILROAD TANK CAR BOTTOM UNLOADING VALVE MADE INOPERABLE BY SOLIDIFIED FLUIDS WITHIN IT

**George Harold McDade, Calgary, Canada, assignor to Chevron Research Company, San Francisco, Calif.**

**Filed Jul. 6, 1976, Ser. No. 703,046**
**Int. Cl.[2] H05B *3/06***
**U.S. Cl. 219—523** **1 Claim**



1. A portable steamless heating apparatus for use with a bottom unloading valve of a railroad tank car, said valve having a central vertical fluid passageway for the unloading of liquids transported in said tank car and a stop member movable to open and close said passageway through which liquids are unloaded, said valve being manually inoperable due to solidification of liquids in said fluid passageway and said stop member, said valve further including a lever for manual operation of the valve and said fluid passageway terminating in a flange member having a central opening forming an axial extension of said fluid passageway, and an external flange member for connecting flow from said valve to a fluid unloading system, said heating apparatus comprising:

an elongated cylindrical electrical heating unit axially insertable through said central opening in said flange member into said fluid passageway of said valve, one end of said unit being adapted to contact said stop member so as to be in direct heat transmitting relationship with said fluid passageway of said valve when a heating element of said heating unit is energized to liquefy solidified fluid which may be contained therein to make said stop member of said valve operable;

an externally threaded tubular member having an opening therethrough surrounding the other end of said heating unit for threadably securing said unit to said flange member,

a cap member having an opening therein slidably engaging the cylindrical surface of said heating unit, said cap member joined to the external end of said tubular member forming a closure for the external end of said tubular member,

retaining means mounted on said cap member for slidably holding said heating unit in said tubular member so that said one end of said heating unit is adjustably positionable relative to said stop member of said valve;

drain means formed in said cap member for draining the fluid from said valve passageway and around said heating unit, and

electrical power control means mounted on said other end of said heating unit for regulating the heat output of said heating unit to liquefy said solidified fluid, said control means including means for electrically connecting the heater element of said heating unit to an external source of electrical power.

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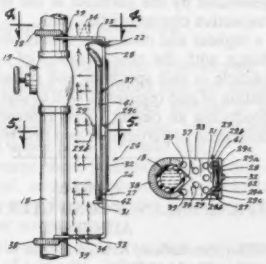
**4,110,603**

## PLASTIC PIPE HEATER

**Jerry D. Peterson, Conrad, and Gerald L. Knief, Grundy Center, both of Iowa, assignors to Ritchie Industries, Inc., Conrad, Iowa**

**Filed Jul. 19, 1976, Ser. No. 706,392**
**Int. Cl.[2] E03B *7/10;* F16L *53/00;* H05B *3/06***
**U.S. Cl. 219—535** **5 Claims**



1. A heater for use with plastic pipe, said heater comprising:

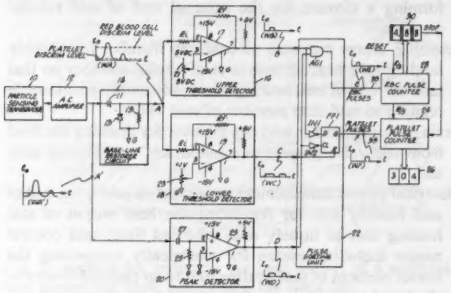
a heating element; and

support means for reducing conduction of heat, said support means including a back portion and ear portions, said heating element being attached to said back portion, said ear portions extending from said back portion and being disposed on the same side of said back portion, each ear portion at the extended free end thereof having a V-shaped recess formed therein, the pipe being received within said recesses when said support means is affixed to the pipe, said heating element being held in spaced relationship to the pipe by said support means, said heating element upon actuation radiating heat, each ear portion intermediate the ends thereof having a plurality of perforations formed therethrough whereby conduction of heat from said heating element to the pipe is reduced and the pipe is warmed by radiated heat.

## 4,110,604
## PARTICLE DENSITY MEASURING SYSTEM

John L. Haynes, Redwood City, and Bernard A. Shoor, Atherton, both of Calif., assignors to Becton, Dickinson and Company, Rutherford, N.J.

Continuation-in-part of Ser. No. 738,896, Nov. 4, 1976, abandoned. This application Sep. 13, 1977, Ser. No. 832,893
Int. Cl.[2] G06M *11/00*
U.S. Cl. 235—92 PC 25 Claims



1. In apparatus for measuring the concentration of particles of a first type in a fluid in which first and second types of particles are suspended, the first and second types of particles generally differing in a detectable physical characteristic, in which apparatus particles suspended in such fluid are sensed as said fluid is flowed through sensing means, and electrical pulses corresponding to said sensed particles are generated, the pulses having an electrical characteristic that corresponds to said physical characteristic,

the combination that comprises:

(a) means responsive to such electrical characteristics of said pulses for discriminating between types of particles in a specimen having different characteristics;

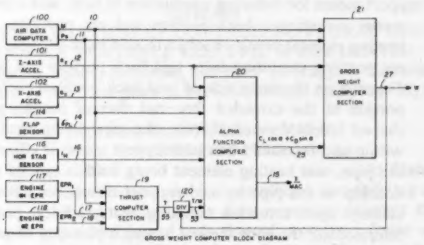
(b) means controlled by said discriminating means for generating separate signals corresponding to pulses generated by the particles in the specimen having the respective characteristics; and

(c) a register and means for setting said register in accordance with the concentration of said second type of particle in said specimen and means controlled by the setting of said register as well as said separate signals for producing an output signal representative of the concentration of particles of said first type in said specimen.

## 4,110,605
## WEIGHT AND BALANCE COMPUTER APPARATUS FOR AIRCRAFT

Harry Miller, Scottsdale, Ariz., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Feb. 25, 1977, Ser. No. 772,186
Int. Cl.[2] G06G *7/78*
U.S. Cl. 364—463 28 Claims



1. Apparatus for providing a measure of the gross weight of an aircraft having engines for providing propelling thrust therefor comprising

a. means responsive to an operating characteristic of the engines for providing a measure of the thrust thereof,

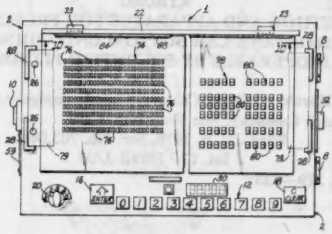
b. means responsive to aerodynamic forces acting on said aircraft and said measure of thrust for providing a measure of a function of the angle of attack of said aircraft, and

c. means responsive to said angle of attack function measure for providing an output measure of the gross weight of said aircraft.

## 4,110,606
## UTILITY METER READOUT SYSTEM

Leland S. Prince, 9014 Charloma Dr., Downey, Calif. 90240, and Neil K. Yarnell, 238 N. Broadoaks, Monrovia, Calif. 91016

Filed Oct. 15, 1975, Ser. No. 622,523
Int. Cl.[2] G06K *15/02*
U.S. Cl. 235—432 18 Claims



1. A calculating and printing apparatus for preparing a printout on a customer card, said apparatus having electronic computing means for calculating output data signals from information on a customer card and stored predetermined data, said apparatus comprising:

a. means for securing said customer card,

b. operator controlled input means for providing first input signals representative of input data,

c. means for automatically sensing information on said customer card and for providing second input signals corresponding hereto,

d. means for feeding said first and second input signals to said computing means,

e. memory storage means connected to said computing means for storing predetermined data,

f. means for printing output data on said customer card corresponding to calculated output data signals from said computing means,

g. recording memory storage means for recording at least some of said calculated output data signals, at least some of said first input data signals and at least some of said second input data signals,

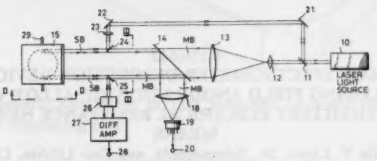
h. wherein said customer card is a utility customer card, at least some of said first input signals corresponds to a present meter reading, at least some of said second input signals correspond to a prior meter reading, said predetermined data stored in said memory storage means corresponds to rate data and said memory storage means comprises two memory locations for respective rate data stored, one memory location containing rate data applicable over a portion of a billing period and the other memory location containing rate data applicable over the remaining portion of the billing period, and

i. wherein said apparatus further comprises wrong day billing control means for providing an additional signal to said computing means applicable for billing on a day other than the one for which said customer card was prepared.

## 4,110,607
## SYSTEM FOR DETECTING HEIGHT FLUCTUATIONS OF A SURFACE ON A RECORDING MEDIUM IN AN OPTICAL RECORDING OR REPRODUCING APPARATUS

**Yoshihiko Honjo, Ayase, and Junji Kuroda, Zama, both of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan**

**Filed Dec. 21, 1976, Ser. No. 753,005**
**Claims priority, application Japan, Dec. 22, 1975, 50-151999; Dec. 22, 1975, 50-171975[U]**
**Int. Cl.[2] G01J *1/20***
**U.S. Cl. 250—201** **8 Claims**




1. A system for detecting height fluctuations of a recording surface in an optical recording or reproducing apparatus,

said recording or reproducing apparatus comprising a light source means for emitting a main light beam for recording or reproducing, an optical system means including an objective lens for focusing said main light beam in a spot on said surface, and control means responsive to control signals for maintaining a constant distance between said objective lens and said recording surface,

said detection system comprising:

means for producing a sub-light beam;

means for introducing said sub-light beam into a peripheral part of said main light beam at one position in the light path thereof, said sub-light beam thus introduced advancing in a forward path through said objective lens to said recording surface to be reflected thereby and returning in a return path through said objective lens and along another peripheral part of said main light beam which is opposite to said one position;

means for extracting said sub-light beam passing through said return path from the light path of said main light beam; and

light detection means having a pair of light detecting surfaces with a common boundary line therebetween to receive said extracted sub-light beam, said light detection means responding to a deviation of the center of said extracted sub-light beam on the light detecting surfaces to a point away from the boundary line for detecting fluctuations in said distance between said objective lens and said recording surface and for producing said control signals responsive thereto.

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## 4,110,608
## TWO-TERMINAL PHOTODETECTORS WITH INHERENT AC AMPLIFICATION PROPERTIES

**Elihu Craig Thomson, Wellesley, Mass., assignor to Electronics Corporation of America, Cambridge, Mass.**

**Filed Nov. 4, 1976, Ser. No. 738,950**
**Int. Cl.[2] H01J *39/12***
**U.S. Cl. 250—214 A** **12 Claims**

1. A two terminal photoresponsive device comprising:

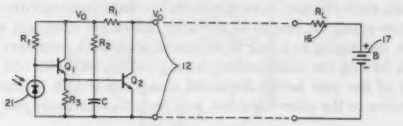
a pair of terminals;

an output transistor having its collector-emitter path connected across said terminals;

a voltage divider incuding two resistors and a capacitor in series connected across said terminals;

photosensing means having a device responsive to incident radiation and including current to voltage conversion means for producing a voltage signal in accordance with incident radiation; and

circuit means interconnecting said conversion means and said voltage divider to drive said output transistor for



amplifying the time varying components of said voltage signal relative to the average value thereof as applied by said output transistor to a load connected to said terminals.

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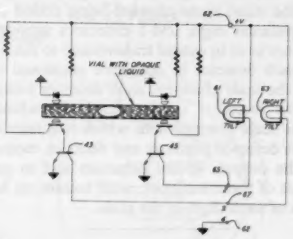
## 4,110,609
## TILT LIMITING DETECTING APPARATUS

**Emmanuel Emil Beer, Eastchester, N.Y., assignor to The Singer Company, Little Falls, N.J.**

**Filed Oct. 22, 1976, Ser. No. 734,906**
**Int. Cl.[2] G01D *5/34***
**U.S. Cl. 250—231 R** **12 Claims**




1. A tilt detecting apparatus comprising:

(a) a base;

(b) an elongated vial of rectangular cross-section, said vial containing an opaque liquid filling said vial except for an air bubble remaining in the upper portion of said vial, horizontally supported on said base, said air bubble remaining in the upper portion of said vial;

(c) a first light source photo transistor combination near one end of said vial, said light source and photo transistor arranged so as to define an optical axis intersecting said vial in its upper portion; and

(d) a second light source photo transistor combination near the other end of said vial, defining a second optical axis intersecting said vial in its upper portion near said other end, whereby the respective photo transistors of said respective first and second combinations will provide an output when said base is tilted so as to move said bubble into a position where it intersects said first or second optical axis, said vial having a shape such that said optical axis intersect said vial at an angle which is approximately 90°.

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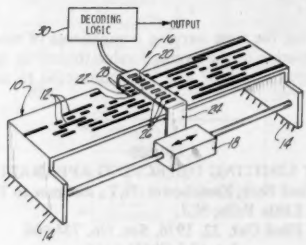
## 4,110,610
## DIGITAL ELECTRICAL POSITION TRANSDUCER

**William L. Mueller, Utica, and Robert J. Winkel, Royal Oak, both of Mich., assignors to Candid Logic, Inc., Hazel Park, Mich.**

**Continuation-in-part of Ser. No. 641,630, Dec. 17, 1975. This application Jun. 27, 1977, Ser. No. 809,997**
**Int. Cl.[2] G01D *5/34***
**U.S. Cl. 250—231 SE** **12 Claims**

1. A position transducer operative to generate an M bit,

parallel, digital signal representative of the position of a first member relative to a second member along an elongate path, comprising: an elongate scale fixed to the first member so as to extend along the path, said scale having 2M-1 elongate channels extending alongside one another along the length of the scale, each channel having a digital coded characteristic which varies along the length of the scale, all of the channels, except one, belonging to a pair of channels, with both members of the pair having the same coding configuration and with one member of the pair being displaced along the length of the scale relative to the other member, and each such channel pair being




operative to encode a single binary digit of a binary output signal, and the stand alone channel being coded to represent the least significant digit; 2M-1 detectors supported on the second member so as to extend transversely to the length of the scale with each detector in operative positional relationship with one of the scale channels, each detector being operative to provide an electrical output signal dependent upon the coding of the scale channel with which it is associated at the instantaneous detector position; and decoder means operative to receive the outputs of the detectors and to generate the output signals of the transducer, with transitions between the binary states of each digit in the code.

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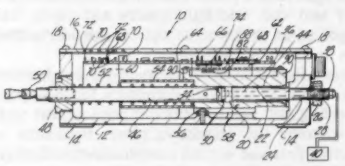
**4,110,611**

## OPTICAL POSITION TRANSDUCER

**Lewis H. Tann; William L. Mueller, both of Troy, and Arthur D. Vis, Warren, all of Mich., assignors to Candid Logic, Inc., Hazel Park, Mich.**

**Filed Dec. 17, 1975, Ser. No. 641,630**
**Int. Cl.[2] H01J 3/14**
**U.S. Cl. 250—237 R** **13 Claims**



1. A transducer for generating a binary, parallel, multi-digit electrical output signal proportional to the position of a part relative to tooling comprising: a housing, fixed with respect to the tooling; an elongated rod supported for motion with respect to the housing; means within the housing for urging motion of the rod to cause one end of the rod to contact the part; a substantially planar printed circuit board fixed in the housing and supporting a plurality of electronic components interconnected to electronic circuitry; an optical source supported on the board and adapted to generate a line of optical radiation, the line extending parallel to the board and normally to the motion of the rod; a plurality of optical detectors arrayed in a line extending parallel to the line of optical radiation and separated from said line of optical radiation in a direction normal to said line and to the plane of said circuit board, said detectors being interconnected with said electronic circuitry; an optical mask having opaque and transparent sections arranged in a binary code with successive parallel binary digits arrayed transverse to an elongate axis of the mask, the optical mask being supported between said line of radiation and said line of radiation detectors; and a connection between the rod and the mask causing motion of the mask along its elongated axis upon motion of the rod whereby the radiation reaching the detectors is a function of the position of the rod.

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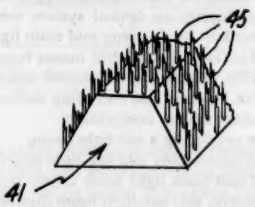
**4,110,612**

## MASS SPECTROMETER DESORPTION DEVICE INCLUDING FIELD ANODE EUTECTIC ALLOY WIRE AND AUXILIARY ELECTRICAL RESISTANCE HEATING MEANS

**Woodfin V. Ligon, Jr., Schenectady, and Eric Lifshin, Loudonville, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Apr. 27, 1977, Ser. No. 791,569**
**Int. Cl.[2] B01D 59/44**
**U.S. Cl. 250—281** **10 Claims**




1. In a field desorption device useful in mass spectrometry including a field emitter insertion rod, a field ion emitter carrier affixed to an end of the insertion rod and comprising a base and two spaced electrodes projecting from the base, and conductor means to connect the carrier with an electric power source, the combination of a field anode in the form of directionally-solidified eutectic alloy wire bridging between and electrically coupled to one of the free ends of the emitter electrodes, said wire consisting of a metal matrix and a second phase in the form of substantially parallel rods in the matrix and projecting a substantially uniform distance from the matrix surface away from the carrier base, said rods being of substantially uniform diameter from 1,000 Angstroms to 10 microns and of population density from $10^9$ to $10^5$ rods per square centimeter.

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**4,110,613**

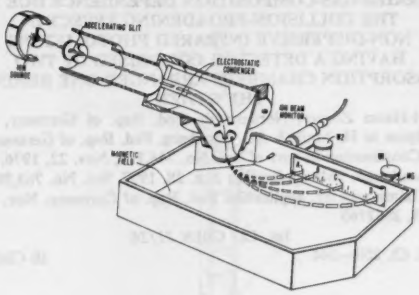
## MAGNETIC TAPE TYPE SENSORS, METHOD AND APPARATUS USING SUCH MAGNETIC TAPE SENSORS

**William M. Hickam, Churchill Borough, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Division of Ser. No. 655,349, Feb. 5, 1976. This application Jul. 18, 1977, Ser. No. 816,557**
**Int. Cl.[2] B01D 59/44**
**U.S. Cl. 250—282** **2 Claims**

1. A mass spectrometer comprising a source of ions of different mass characteristics, a field for deflecting said ions toward a spectrum recording surface, said spectrum recording surface

consisting in magnetic material exposed to local alteration under sputtering by said deflected ions, and means for sensing




the magnetic alterations in said magnetic material along a general measuring axis.

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**4,110,614**

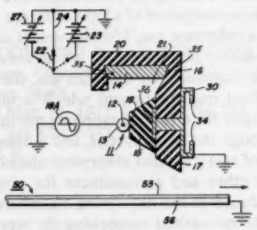
## CORONA DEVICE

**Dror Sarid, Rochester, and Thomas G. Davis, Pittsford, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Dec. 17, 1976, Ser. No. 751,826**

**Int. Cl.[2] H01T *19/04***

**U.S. Cl. 250—324** **10 Claims**



1. In combination;
a dielectric support having two spaced upstanding legs,
a imaging surface oriented in a plane generally parallel to the planes containing said legs,
the leg closest to said surface supporting an insulated wire,
an a.c. corona generating potential coupled to said wire, and
the other of said legs carrying a conductive member facing said wire and coupled to a reference potential.

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**4,110,615**

## AUTOMATIC RADIOCHROMATAGRAM STRIP SCANNER

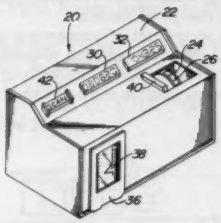
**Robert L. McCann, 27 Thornton Pl., Mount Holly, N.J. 08060**

**Filed Nov. 16, 1977, Ser. No. 851,926**

**Int. Cl.[2] G01T *1/00***

**U.S. Cl. 250—328** **13 Claims**

1. Apparatus for automatically scanning processed chromatagrams of radiopharmaceuticals to provide an indication of the biological behavior thereof, comprising: sample carrier means for receiving a processed chromatagram, radioactivity detecting means for counting radioactive emissions of samples disposed adjacent thereto, said carrier means being moved relative to said radioactivity detector so that said detector traverses said chromatagram to count the radioactive emissions thereof and provide output signals indicative of the spectral distribution of the radioactivity along the chromatagram, display means responsive to said output signal to provide a digital readout of the number of emissions detected in the




entire chromatagram as well as the number of emissions detected within a preselected portion thereof.

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**4,110,616**

## PYROELECTRIC DETECTORS

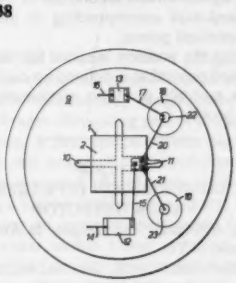
**Stephen George Porter, Towcester, and David Appleby, Northampton, both of England, assignors to Plessey Handel und Investments A.G., Zug, Switzerland**

**Filed Jan. 14, 1977, Ser. No. 759,478**

**Claims priority, application United Kingdom, Jan. 16, 1976, 01681/76**

**Int. Cl.[2] G01J *5/20***

**U.S. Cl. 250—338** **24 Claims**



1. A pyroelectric detector which includes at least one pyroelectric element consisting of a pyroelectric material sandwiched between first and second electrodes, and a semiconductor chip having a field effect transistor formed on one surface thereof and having an electrical contact for the gate electrode of the transistor formed on the surface thereof, opposite to said one surface, the gate electrode contact of the chip being mechanically secured to and in electrical contact with the first one of the electrodes of the pyroelectric element, the size of the chip being such that a portion of the first electrode is not covered by the chip.

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**4,110,617**

## INFRA-RED PROFILOMETER

**Edouard Legille, 165, rte de Treves, Luxembourg, Luxembourg, assignor to S.A. des Anciens Etablissements Paul Wurth, Luxembourg**

**Filed Mar. 14, 1977, Ser. No. 777,443**

**Claims priority, application Luxembourg, Mar. 17, 1976, 74579**

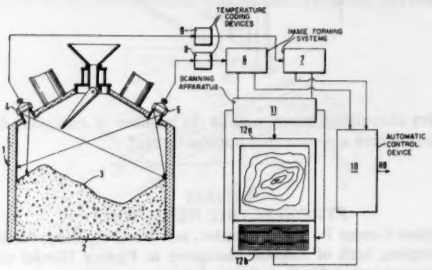
**Int. Cl.[2] G01J *1/00*; G01F *23/00***

**U.S. Cl. 250—342** **25 Claims**

1. A method for determining the three-dimensional surface profile of the charge or burden in a furnace without physically contacting the charge or burden or interrupting the charging of the furnace, which comprises the steps of:
(a) generating a first set of temperature-position signals from

a first infra-red radiation measuring instrument, said first instrument being located over the charge or burden, said first set of signals corresponding to infra-red rays emitted from a series of temperature-characterized points on the surface of the charge or burden;

(b) generating a second set of temperature-position signals from a second infra-red radiation measuring instrument, said second instrument being located over the charge or burden in a known position and orientation relative to said




first instrument, said second set of signals corresponding to infra-red rays emitted from said series of points;

(c) pairing individual signals in said first set of signals with individual signals in said second set of signals that represent infra-red rays corresponding to identical temperature-characterized points;

(d) determining the position in space for each temperature-characterized point that is defined by each pair of signals, to provide multiple positions representing the three-dimensional profile.

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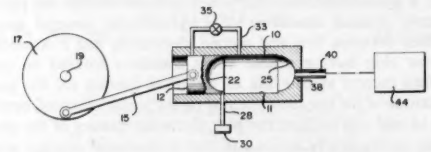
**4,110,618**

## ADIABATIC COMPRESSION INFRARED EMISSION VAPOR DETECTOR

**Mark Schuman, Arlington, Va., assignor to American Standard Inc., New York, N.Y.**

**Filed Jun. 8, 1965, Ser. No. 462,380**
**Int. Cl.[2] G01N *21/26***
**U.S. Cl. 250—343** **9 Claims**



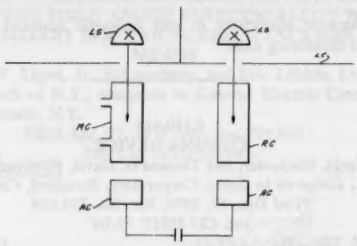

1. Apparatus for the detection of contaminants in a gaseous medium by observation of the characteristic infrared spectral emissions of said contaminants, comprising a variable volume opaque optical cavity of at least partly spherical shape and having highly reflective walls, means for varying the volume of said cavity for periodic adiabatic compression of a sample of said gaseous medium within said cavity, whereby the temperature of said sample varies in accordance with $TV^{\gamma-1} = K$, where $T$ is the temperature, $V$ the volume, and $\gamma$ the ratio of specific heats at constant pressure and constant volume for said sample, and K is a constant, said emissions occurring upon increase in temperature of said sample concurrent with compression thereof if said contaminants are present therein, said highly reflective walls and at least partly spherical shape of said cavity providing random optical paths for said emissions and high amplitude spectral radiance, and means responsive to said emissions for absorbing infrared therefrom to detect the presence of said contaminants, or any one of them, in said sample.

**4,110,619**

## METHOD OF COMPENSATING FOR CARRIER-GAS-COMPOSITION DEPENDENCE DUE TO THE COLLISION-BROADENING EFFECT IN NON-DISPERSIVE INFRARED PHOTOMETERS HAVING A DETECTOR COMPRISED OF TWO ABSORPTION CHAMBERS ARRANGED ONE BEHIND THE OTHER

**Karl-Heinz Zörner, Norderstedt, Fed. Rep. of Germany, assignor to H. Maihak AG, Hamburg, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 744,175, Nov. 22, 1976, abandoned. This application Jan. 28, 1977, Ser. No. 763,585**
**Claims priority, application Fed. Rep. of Germany, Nov. 21, 1975, 2552165**
**Int. Cl.[2] G01N *21/26***
**U.S. Cl. 250—344** **10 Claims**




1. A method of setting up a non-dispersive infrared photometer of the type comprised of a light source, a reference cuvette containing a reference gas, a measurement cuvette containing an infrared-active gas component whose concentration is to be measured accompanied by a carrier gas, the carrier gas comprising at least one component which is infrared-inactive, a light modulator for effecting antiphase modulation of the light passing through the two cuvettes, and a detector arrangement comprised of two gas-filled absorption chambers arranged one behind the other and a transducer for converting pressure changes induced in the absorption chambers into a measurement signal, the method comprising the step of adjusting the photometer to render the measurement signal substantially independent of the composition of the carrier gas in the measurement cuvette.

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**4,110,620**

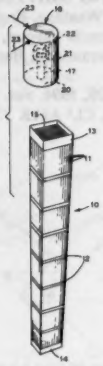
## FUEL ROD LEAK DETECTOR

**Robert Edward Womack, Lynchburg, Va., assignor to The Babcock & Wilcox Co., New York, N.Y.**

**Filed Mar. 10, 1975, Ser. No. 556,762**
**Int. Cl.[2] G01T *1/20***
**U.S. Cl. 250—361 R** **3 Claims**

1. Apparatus for inspecting the structural integrity of radioactive fuel rods comprising a radiation shield having a radiation collimator formed therein in alignment with one of the fuel rods for the transmission of fuel rod radiation therethrough, a radiation energy sensitive detector within said shield and in alignment with said collimator and said transmitted fuel rod radiation for producing a signal that characterizes

at least one radioactive material within the fuel rod, means for determining if the radioactive material has been retained



within the rod, and means for aligning said collimator and said detector with the fuel rod.

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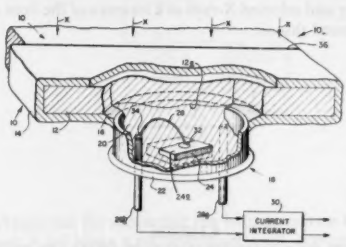
**4,110,621**

## TOMOGRAPHY X-RAY DETECTOR

**Berthold K. P. Horn, Concord, Mass., assignor to Butler-Newton, Inc., Newton, Mass.**

**Filed Mar. 23, 1977, Ser. No. 780,284**
**Int. Cl.[2] G01T *1/20, 1/22***
**U.S. Cl. 250—361 R** **11 Claims**




1. An X-ray detector for use in integrating mode in high speed tomography apparatus comprising:

A. a scintillator that emits light in response to incident X-rays, said scintillator having a surface of a selected total area,

B. a coating that reflects said light emitted by the scintillator covering the entire surface area of said scintillator except for a window in one surface,

c. a photo-diode whose output current is substantially linearly related to the light incident on the diode, said diode having one surface positioned directly opposite said window, the ratio of the active area of the diode to the area of the scintillator covered by said coating being appreciably less than unity, and

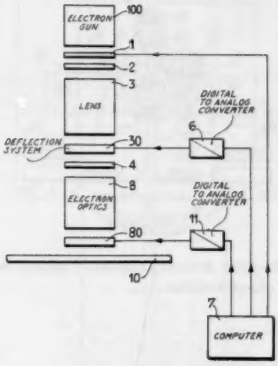
D. means for bonding said diode to said one scinitiallator surface in said window, said bonding means being transparent to the light emitted by the scintillator in response to the incident X-rays.

**4,110,622**

## DEVICE WHICH MAKES IT POSSIBLE TO EFFECT THE PROGRAMMED TRACING OF FIGURES WHICH HAVE DIFFERENT SHAPES

**Jacques Trotel, Paris, France, assignor to Thomson-CSF, Paris, France**

**Filed May 13, 1977, Ser. No. 796,708**
**Claims priority, application France, May 14, 1976, 76 14719; Jan. 31, 1977, 77 02600**
**Int. Cl.[2] G21K *1/08***
**U.S. Cl. 250—396 R** **13 Claims**




1. A device of the kind in which a particle optical beam projects on to an object an image formed by a successive programmed traces of elementary images, comprising in a first plane a first diaphragm eliminating part of the beam formed by said optical system, a first optical system being provided in order to form a real image of said diaphragm with a given magnification, in a second object plane, said second object plane containing a second diaphragm, said real image and said diaphragm forming an apparent diaphragm, first electrically controlled deflection means being provided and arranged between the first and second object planes in order in programmed fashion to displace said real image in said first object plane and to vary the shape of said apparent diaphragm, a second optical system being provided in order to form the real image of said apparent diaphragm upon the object, and second electrically controlled deflection means being provided in order to displace said real image on said object.

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**4,110,623**

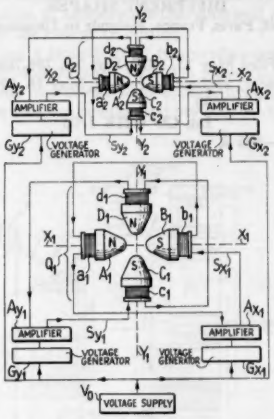
## DEVICE FOR SCANNING A TARGET WITH A BEAM OF CHARGED PARTICLES

**Guy Azam, and Claude Perraudin, both of Buc, France, assignors to CGR-MeV, Paris, France**

**Filed Feb. 15, 1977, Ser. No. 768,907**
**Claims priority, application France, Feb. 17, 1976, 76 04346**
**Int. Cl.[2] G01K *1/08***
**U.S. Cl. 250—398** **10 Claims**

1. A device for scanning a target with a beam of charged particles on both sides of an axis ZZ, said device comprising a main magnetic scanning system of axis ZZ, having a plurality of polepieces, each of said polepieces being associated with a coil, said main scanning system being associated with a secondary magnetic system located upstream of said main system along the axis ZZ and intended for variably offsetting said beam in relation to said axis ZZ before entering said main system, said secondary magnetic system having a plurality of

polepieces, each of said polepieces being associated with a coil, means being provided for applying to said coils of the main and




secondary multi-polar systems, electrical signals which have predetermined characteristics.

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**4,110,624**

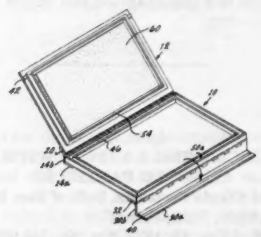
## X-RAY FILM HOLDER OR CASSETTE

**Alexander P. Conteas, 16690 Glass Mountain St., Fountain Valley, Calif. 92708**

**Continuation-in-part of Ser. No. 663,960, Mar. 4, 1976, abandoned. This application Feb. 10, 1977, Ser. No. 767,528**

**Int. Cl.[2] G03C *5/16***

**U.S. Cl. 250—481** **17 Claims**



15. A cassette construction comprising a flat plate front member, a flat plate back member, a hinge construction at one side of said members, the hinge construction having hinge leaves having attachment to the front plate back plate, one of said leaves forming a side wall for the cassette, and a catch construction at opposite edges of the front and back plates, the catch construction having hinge means having attachment to one of said plates and forming another opposite side wall of the cassette, the plate members, hinge construction, and catch construction being free from portions forming additional cassette side or end walls.

**4,110,625**

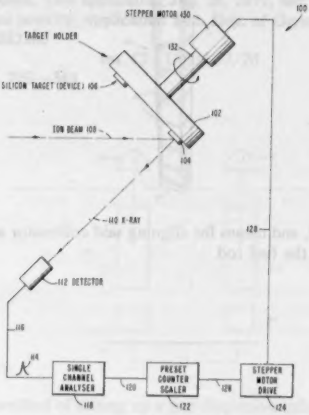
## METHOD AND APPARATUS FOR MONITORING THE DOSE OF ION IMPLANTED INTO A TARGET BY COUNTING EMITTED X-RAYS

**James Anthony Cairns, Wantage, England; Allen Lurio, Dobbs Ferry, and James Francis Ziegler, Putnam Valley, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 20, 1976, Ser. No. 752,779**

**Int. Cl.[2] A61K *27/02***

**U.S. Cl. 250—492 A** **12 Claims**




1. Method of monitoring dose of ions implanted into a target comprising the steps of:

providing a target for ion implantation;

providing a beam of ions to said target;

selecting x-rays emitted from said target for counting;

wherein said selected x-rays are from the spectrum which includes low energy soft x-rays; and

counting said selected X-rays as a measure of the dose of ions implanted therein.

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**4,110,626**

## METHOD FOR IMPROVING THE QUALITY OF THE FRAGRANCE OF PERFUMES USING ALIPHATIC DIBASIC ACID DIESTERS

**Michihisa Katada; Katsutake Hayashi, both of Tokyo; Hakuji Katsura, Yokohama; Kenichi Tomita, Tokyo; Hideo Morohoshi; Keiichi Uehara, both of Yokohama, and Hiroshi Tanaka Ebina, all of Japan, assignors to Shiseido Co., Ltd., Tokyo, Japan**

**Filed Jan. 27, 1977, Ser. No. 763,214**

**Claims priority, application Japan, Jan. 30, 1976, 51-9674**

**Int. Cl.[2] C11B *9/00***

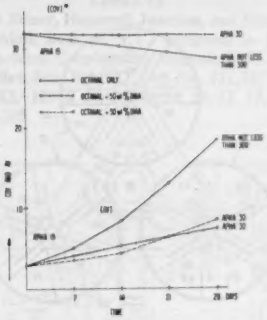
**U.S. Cl. 252—522** **7 Claims**

1. A method for improving the quality of the fragrance of a natural or synthetic perfume, which comprises formulating a perfume containing at least one aliphatic dibasic acid diester of the general formula:

$$R_1OCOR_2COOR_3$$

wherein $R_1$ and $R_3$, which can be the same or different, each

represents a saturated branched chain alkyl group containing 4 or 5 carbon atoms, and $R_2$ represents a saturated straight chain



alkylene group containing 4 carbon atoms, as an active ingredient.

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**4,110,627**

## DETECTING LATERAL POSITION OF WEBS

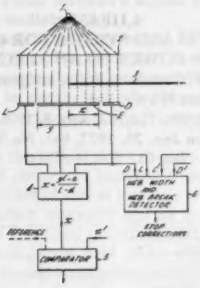
**Jeffrey Isherwood, Enfield, England, assignor to Crosfield Electronics Limited, United Kingdom**

**Filed Mar. 30, 1977, Ser. No. 782,830**

**Claims priority, application United Kingdom, Apr. 1, 1976, 13285/76**

**Int. Cl.² G01N *21/30***

**U.S. Cl. 250—561** **7 Claims**



1. Apparatus for measuring the lateral position of a web as the web is fed along a predetermined path, comprising:

a position-detecting means located at a margin of the said web path and including a single light source on one side of the web plane and further including on the other side of the web plane

an innermost photoelectric detector positioned so that when the lateral position of the edge of the web is within a predetermined range of adjustment the path from the light source to the innermost detector is interrupted by the web,

a central photoelectric detector positioned so that when the web edge is within the said predetermined range of adjustment the path from the light source to the central detector is partly interrupted by the web,

and an outermost photoelectric detector positioned so that when the web edge is within the said predetermined range of adjustment the path from the light source to the outermost detector is uninterrupted;

and means jointly responsive to the detector signals to provide an output signal representing the lateral position of the web corrected in accordance with the outputs of the outermost and innermost detectors for light source intensity variations and for web translucence, respectively.

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**4,110,628**

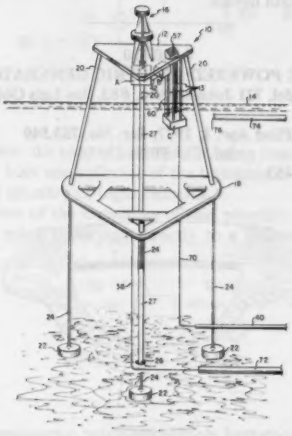
## SOLAR SEA POWER SYSTEM

**Peter L. Paull, Weston, Conn., and Henry W. Archer, New York, N.Y., assignors to Texaco Development Corporation, New York, N.Y.**

**Filed Oct. 19, 1976, Ser. No. 733,838**

**Int. Cl.² H02P *9/04***

**U.S. Cl. 290—1 R** **10 Claims**



1. A solar sea power system comprising, a platform installed offshore over an undersea well hole for exploration and/or production of gaseous and liquid hydrocarbons; means on said platform for extracting gaseous and liquid hydrocarbons from said well hole; gas-liquid separating means for separating said gaseous hydrocarbons from said liquid hydrocarbons; first turbine means communicating with said separating means and actuated by the semi-adiabatic expansion of said gaseous hydrocarbons which are thereby cooled; first electricity-producing generating means driven by said first turbine; a heat exchanger receiving said cooled gaseous hydrocarbons; pump means for bringing solar heated surface water to said heat exchanger to heat said gaseous hydrocarbons; second turbine means actuated by the thus heated gaseous hydrocarbons and second electricity-producing generating means driven by said second turbine means.

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**4,110,629**

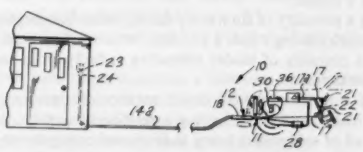
## INDOOR AUTOMOBILE STARTING SYSTEM

**James D. Dotson, and Annette Jones, both of 2630 Bissonnet, #96, Houston, Tex. 77098**

**Filed Jul. 16, 1976, Ser. No. 706,054**

**Int. Cl.² B60R *25/10***

**U.S. Cl. 290—38 R** **4 Claims**



1. A remote control automobile starting system, comprising a hand-held and key operated control device,

electrical cable means and throttle control means secured to said control device, and

first disconnect plug means secured to said cable means,

second disconnect plug means secured to telescoping pipe and cable means secured to said automobile,

pulley means secured to said automobile, providing wire guide means for said throttle control to actuate the carburetor throttle, and

electrical connection means connecting said second disconnect plug to the battery of said automobile, the starter, the ignition coil, the alternator, and the transmission neutral switch, for starting said car by operation of said key operated control device.

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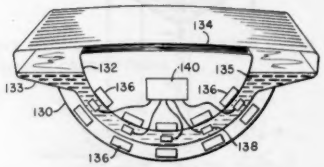
## 4,110,630
## WAVE POWERED ELECTRIC GENERATOR

**Frank J. Hendel, 721 Johnson Ave. #83, San Luis Obispo, Calif. 93401**

**Filed Apr. 1, 1977, Ser. No. 783,549**
**Int. Cl.² F03B *13/12***
**U.S. Cl. 290—53** **6 Claims**




1. A wave-powered electric generator comprising:

a buoyant envelope which is fully water tight and air tight;

a container within the buoyant envelope shaped to permit liquid within it to move relative to the walls of the container as the buoyant envelope is subjected to wave motion;

a conductive liquid received within the container;

means applying a concentrated magnetic field to at least some of the conductive liquid received within the container;

electrode means positioned to receive at least some of the electrical energy generated as the conductive liquid passes through the concentrated magnetic field;

means connected to the electrode means for rectifying the electrical energy generated by relative motion of the conductive liquid within the magnetic field; and

power transmission means for supplying the generated, rectified electric energy to a power distribution station.

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## 4,110,631
## WIND-DRIVEN GENERATOR

**Edmund L. Salter, San Diego, Calif., assignor to Wind Power Systems, Inc., San Diego, Calif.**

**Continuation-in-part of Ser. No. 489,190, Jul. 17, 1974, abandoned. This application Dec. 8, 1975, Ser. No. 638,605**
**Int. Cl.² F03D *9/00***
**U.S. Cl. 290—55** **30 Claims**

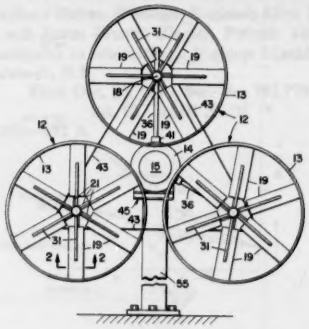
1. In a wind-driven generator:

(a) a frame;

(b) a plurality of forwardly-facing wind-intercepting rotors, each having a hub, a circular rim coaxial with said hub and a plurality of blades extending radially from said hub to said rim;

(c) a power take-off drum rotationally mounted on said frame, said drum having a peripheral surface, the rims of all of said rotors being in frictional engagement with said peripheral surface at points spaced equidistantly thereabout;

(d) means for rotatably mounting said rotors on said frame and for pressing the rotor rims against said drum in response to presence of force exerted upon the upwind side




of said rotors and with a reduced force that varies as a positive function of said wind force.

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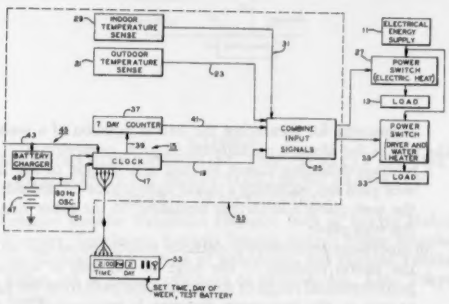
## 4,110,632
## DEVICE, METHOD AND SYSTEM FOR CONTROLLING THE SUPPLY OF POWER TO AN ELECTRICAL LOAD

**Alvin D. Wyland, Williamsburg, Iowa, assignor to General Electric Company, Fort Wayne, Ind.**

**Continuation of Ser. No. 711,703, Aug. 5, 1976, abandoned. This application Jan. 28, 1977, Ser. No. 763,481**
**Int. Cl.² H01H *37/00***
**U.S. Cl. 307—117** **27 Claims**




18. A method of controlling the supply of power to an electrical load comprising the steps of:

counting timing signals through a predetermined time period with the timing signals comprising alternating current of source thereof and establishing a preselected range of time within at least a portion of the predetermined time period;

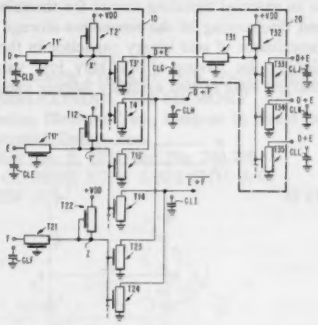
monitoring an ambient condition during the predetermined time period; and

inhibiting the supply of power to the load when the monitored condition attains preselected criteria therefor only during the preselected time range.

## 4,110,633
## DEPLETION/ENHANCEMENT MODE FET LOGIC CIRCUIT

**Eugene Martin Blaser, Hopewell Junction, and Donald Adelbert Conrad, Fishkill, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jun. 30, 1977, Ser. No. 811,737**
**Int. Cl.[2] H03K** *19/08, 19/34, 19/32, 17/60*
**U.S. Cl. 307—205** **11 Claims**



1. An improved field effect transistor logic circuit comprising:

a first depletion mode input field effect transistor having its drain to source path connected between an input node and a first intermediate node and its gate electrode connected to a first fixed potential;

a self biased second depletion mode field effect transistor connected as a load between a second fixed potential and said first intermediate node;

at least one enhancement mode output field effect transistor having its gate electrode connected to said first intermediate node, its source electrode connected to said first fixed potential and its drain electrode connected to an output node having a substantial load capacitance associated therewith; and

a third depletion mode field effect transistor having its drain to source path connected between a second intermediate node and the drain of said at least one enhancement mode output field effect transistor and its gate electrode connected to said first fixed potential; and

a fourth depletion mode field effect transistor connected between said second fixed potential and said second intermediate node;

whereby said output node connected to the drain electrode of said at least one enhancement mode output field effect transistor has a potential variable between said first fixed potential and another potential which is a function of the threshold voltage of said third depletion mode field effect transistor.

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## 4,110,634
## GATE CIRCUIT

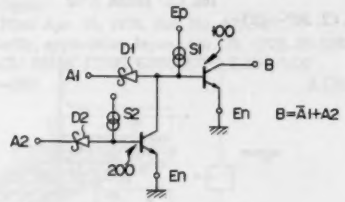
**Yukuya Tokumaru, and Masanori Nakai, both of Yokohama, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Tokyo, Japan**

**Filed Aug. 9, 1976, Ser. No. 712,668**
**Claims priority, application Japan, Aug. 9, 1976, 51-96786; Aug. 9, 1975, 50-96787**
**Int. Cl.[2] H03K** *19/08, 19/20*
**U.S. Cl. 307—213** **10 Claims**

1. A gate circuit having a plurality of logic elements formed on a single semiconductor substrate,

each of said plurality of logic elements comprising at least one Schottky diode having a cathode and an anode, the cathode operating as an input to the logic element; a transistor having a base connected to an anode of said at least one Schottky diode, at least one collector, at least one emitter, and operating as an inverter; and a current source circuit element connected to said base of said transistor and said anode of said at least one Schottky diode,

one of said plurality of logic elements being the output of said gate circuit at the said at least one collector of its




transistor, the base of its transistor being connected to the said at least one collector of the transistor of another one of said plurality of logic elements,

the emitters of the transistors of said plurality of logic elements being connected directly to a common potential point.

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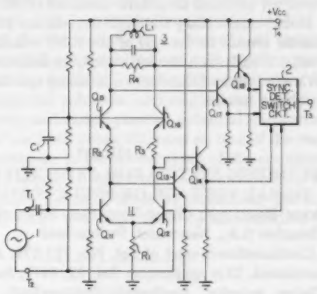
## 4,110,635
## AMPLIFYING CIRCUIT

**Masayuki Hongu, Komae; Masaharu Tokuhara, Tokyo, and Hiromi Kawakami, Yokohama, all of Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Aug. 18, 1976, Ser. No. 715,630**
**Claims priority, application Japan, Aug. 19, 1975, 50-100291**
**Int. Cl.[2] H03K** *5/00, 9/06*
**U.S. Cl. 307—233 R** **7 Claims**




1. An amplifier arrangement comprising:

an amplifier stage including at least a common emitter transistor and first collector load means connected to the collector of said transistor;

an input signal source connected to the base of said transistor;

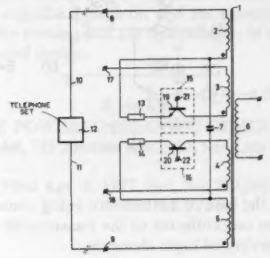
a grounded base stage including a common base transistor having its emitter connected to said first collector load means, and second collector load means connected to the collector of said common base transistor; and

first and second output means connected with the collector of said common emitter transistor and the collector of said common base transistor, respectively.

## 4,110,636
## FEEDING BRIDGE

Eise Carel Dijkmans, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 22, 1977, Ser. No. 770,809
Claims priority, application Netherlands, Mar. 5, 1976, 7602292
Int. Cl.[2] H03K 1/02
U.S. Cl. 307—237 6 Claims




1. A bridge circuit comprising, a pair of terminals for connection to a transmission line, an isolation transformer having four primary windings with equal numbers of turns and a secondary winding, an isolation capacitor, means connecting one end of the capacitor to the beginning of the first winding and via a first transistor circuit to the beginning of the second winding, means connecting the other end of the capacitor to the end of the fourth winding and to the end of the third winding via a second transistor circuit complementary to the first transistor circuit, means connecting the end of the first winding and the beginning of the fourth winding respectively to the pair of terminals, means coupling the end of the second winding to a first terminal of a voltage source and the beginning of the third winding to a second terminal of the voltage source, the transistor circuits each comprising a main current path which has a high impedance at one end and a low impedance at the other end and a control terminal, means connecting the high-impedance end of the first transistor to the beginning of the second winding and the low-impedance end via a first supply resistor to the beginning of the first winding and the control terminal to a third terminal of the voltage source, and means connecting the high-impedance end of the second transistor circuit to the end of the third winding and the low-impedance end via a second supply resistor to the end of the fourth winding and the control terminal to a fourth terminal of the voltage source.

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## 4,110,637
## ELECTRONIC SYSTEM FOR CAPACITIVELY STORING A SIGNAL VOLTAGE OF PREDETERMINED LEVEL

Andreas Rusznyak, Chene-Bougeries, Switzerland, assignor to Ebauches S.A., Neuchatel, Switzerland

Continuation-in-part of Ser. No. 711,879, Aug. 5, 1976, abandoned. This application Jul. 12, 1977, Ser. No. 815,016
Claims priority, application Switzerland, Aug. 8, 1975, 10363/75
Int. Cl.[2] H03K 17/60; G11C 11/24
U.S. Cl. 307—238 7 Claims

1. A circuit arrangement for the storage of a signal voltage of predetermined level, comprising:

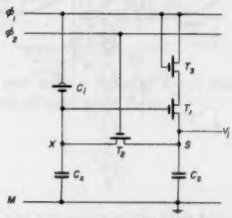
two conductors connected across a source of recurrent unipolar clock pulses, one of said conductors being grounded;

a main storage capacitor and an ancillary storage capacitor both connected to said one of said conductors;

supply means including at least said one of said conductors for charging said main storage capacitor with a voltage having the same polarity as said clock pulses;

a normally nonconductive first semiconductor element inserted between said supply means and said main storage capacitor on the side opposite said one of said conductors, said first semiconductor element forming a first junction with said main storage capacitor and being provided with a control electrode;

a binary capacitor of the same conductivity type as said first semiconductor element inserted between said ancillary storage capacitor and the other of said conductors, said binary capacitor forming with said ancillary storage capacitor a second junction tied to said control electrode, at least one of said junctions being temporarily connectable to an external signaling circuit for the selective charging and discharging of the respective storage capacitor, the capacitance of said binary capacitor in the presence of a clock pulse having a relatively low value in the discharged state of said ancillary storage capacitor and having a relatively high value upon said ancillary storage capacitor carrying a predetermined minimum charge, said high value enabling conduction of said first semiconductor element for the duration of a driving pulse whereby said main storage capacitor is charged from said supply means; and



a second semiconductor element inserted between said junctions for enabling the transfer of charges from said main storage capacitor to said ancillary storage capacitor between clock pulses while preventing a reverse charge transfer in the presence of a clock pulse;

said supply means including a third semiconductor element inserted between said other of said conductors and said first semiconductor element for transmitting said clock pulses to said main storage capacitor in the conductive condition of said first semiconductor element.

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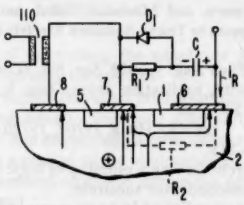
## 4,110,638
## CONFIGURATION FOR REDUCING THE TURN-OFF TIME OF A THYRISTOR

Peter Voss, Munich, Germany, assignor to Patent-Treuhand-Gesellschaft fur Elektrische Gluhlampen m.b.H., Munich, Germany

Filed Feb. 23, 1977, Ser. No. 771,278
Claims priority, application Fed. Rep. of Germany, Feb. 25, 1976, 2607678
Int. Cl.[2] H03K 17/72
U.S. Cl. 307—252 C 4 Claims



1. An arrangement for reducing turn-off time of a thyristor having a main emitter electrode affixed to a main emitter re-

gion, a control electrode affixed to a base region, and including an auxiliary thyristor which is adapted to amplify a control current and has an auxiliary emitter electrode affixed to an emitter region of the auxiliary thyristor, said arrangement including a voltage source electrically connected to the auxiliary thyristor and adapted to supply to said auxiliary emitter an electrical current opposite in direction to the control current supplied to the thyristor, said voltage source being interposed between the main emitter electrode and the auxiliary emitter electrode and being connected electrically in series with an electrical resistance.

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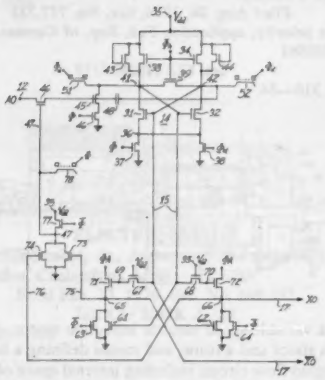
**4,110,639**

## ADDRESS BUFFER CIRCUIT FOR HIGH SPEED SEMICONDUCTOR MEMORY

**Donald J. Redwine, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Dec. 9, 1976, Ser. No. 748,790**
**Int. Cl.² H03K** *3/286, 3/353;* **G11C** *8/00*
**U.S. Cl. 307—279** **19 Claims**



1. An input buffer circuit for an address input of a semiconductor memory device, comprising:

a pair of driver transistors substantially unbalanced in size and characteristic, each driver transistor having a control electrode and two output electrodes, the driver transistors being cross coupled by connection of the control electrode of each to an output electrode of the other;

a pair of precharge transistors, one for each of the driver transistors, the precharge transistors being substantially balanced in size and characteristic, each of the precharge transistors being connected in series with one of the driver transistors and a supply voltage;

means connected to turn on the pair of precharge transistors and to turn off the precharge transistors at a preselected time in an operating cycle;

means to short output electrodes of the pair of cross coupled driver transistors together to equalize the voltages on such output electrodes prior to said preselected time in an operating cycle;

means connected to one of the output electrodes of one of said pair of cross coupled driver transistors to couple said one of the output electrodes to a reference potential when said address input is present beginning at said preselected time;

means for applying a charge to each of the output electrodes a short delay time after said preselected time to retard discharge of one of the output electrodes; and

a pair of address signal output circuits, each of which has an input connected to an output electrode of a different one of the pair of cross coupled driver transistors and responsive to the voltage level thereof beginning at a time after said short delay time during an operating cycle, one of the pair of address signal output circuits producing an address signal and the other producing the complement of the address signal.

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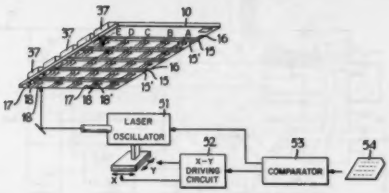
**4,110,640**

## STANDARD SIGNAL GENERATING APPARATUS

**Kazuo Ito, Komae, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan**

**Filed Apr. 26, 1976, Ser. No. 679,937**
**Claims priority, application Japan, Apr. 28, 1975, 50-51935**
**Int. Cl.² H03K** *17/00;* **G04C** *3/00;* **B23K** *9/00*
**U.S. Cl. 307—303** **3 Claims**




1. In combination: a transparent substrate having a pair of opposed major surfaces; and a plurality of standard signal generating circuits each comprising a mechanical vibrator disposed on one of said major surfaces, an oscillator circuit for driving said mechanical vibrator to vibrate and for developing an oscillatory output signal determined by said mechanical vibrator, a metallic thin film disposed on said one major surface and defining thereon a frame of metallic thin film surrounding said mechanical vibrator and said oscillator circuit, a metallic, cover disposed on said major surface and covering said mechanical vibrator and said oscillator circuit and joined to said frame to peripherally seal said cover to said substrate, a divider circuit disposed within said cover and connected to receive the oscillatory output signal of said oscillator for developing a lower frequency oscillatory standard frequency signal having a standard frequency determined by the oscillator frequency and a dividing ratio of said dividing circuit, and said dividing circuit having at least one adjusting lead for receiving a power signal for setting the dividing ratio of said divider circuit according to whether said at least one adjusting lead is connected to a positive potential lead or a negative potential lead of the power signal and thereby setting the value of said standard frequency, said positive potential lead and said negative potential lead comprising polished conductive pins extending through said transparent substrate, and said at least one adjusting lead being connected to said positive potential lead and said negative potential lead and being disposed on one of the major surfaces of said substrate to permit breaking of the connection of said at least one adjusting lead with a respective one of said positive and negative potential leads by irradiating the same with laser light in order to set the value of said standard frequency.

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**4,110,641**

## CMOS VOLTAGE COMPARATOR WITH INTERNAL HYSTERESIS

**Robert L. Payne, Crystal, Minn., assignor to Honeywell Inc., Minneapolis, Minn.**

**Filed Jun. 27, 1977, Ser. No. 810,226**
**Int. Cl.² H03K** *5/20;* **H03F** *3/185, 3/16, 3/45*
**U.S. Cl. 307—355** **8 Claims**

1. A CMOS comparator with internal positive current feedback for generating hysteresis in the switching of the output voltage signal as a function of the input voltage signal, said comparator comprising:

a transconductance amplifier for generating a current through a first insulated gate field effect transistor which is a function of voltage at its input, said first insulated gate field effect transistor having its source connected to a first

potential terminal and having its drain connected to a common junction terminal;

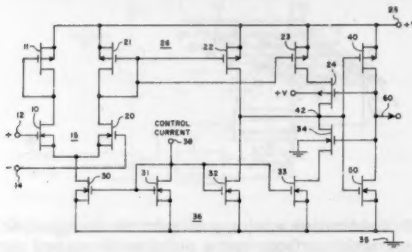
a second insulated gate field effect transistor having its source to drain conduction path connected between said common junction terminal and a second potential terminal;

a source of control current;

means for generating a first feedback current as a function of said control current;

an output terminal;

an output inverter comprised of third and fourth insulated gate field effect transistors, said third transistor having its




source to drain conductive path connected between said output terminal and said first potential terminal and said fourth transistor having its source to drain conductive path connected between said output terminal and said second potential terminal, said third and fourth transistors further having their gate electrodes connected to said common junction terminal; and

switching means connected to said means for generating said first feedback current and to said output terminal for connecting said first feedback current in parallel with said first transistor as a function of voltage at said output terminal.

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**4,110,642**

## NOISE REDUCTION ARRANGEMENT IN A CLAW-TYPE DYNAMO ELECTRIC MACHINE, PARTICULARLY MULTI-PHASE AUTOMOTIVE-TYPE A-C GENERATOR

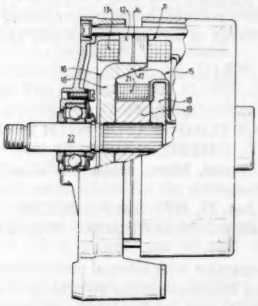
**Hubertus Thiele, Ditzingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Feb. 24, 1977, Ser. No. 771,805**

**Claims priority, application Fed. Rep. of Germany, Mar. 3, 1976, 2608689**

**Int. Cl.² H02K 5/24**

**U.S. Cl. 310—51** **6 Claims**



1. Claw pole-type dynamo electric machine having

a stack of stator laminations (12) formed of dynamo electric machine lamination steel sheet material;

armature windings (13) located on the stator stack;

and a claw pole-type field structure (15) rotatably supported within the stator stack,

comprising,

means decreasing the axial stator flux concentration flowing through the stator laminations including an intermediate lamella (14) of a material different from said dynamo electric lamination steel sheet material positioned centrally within said stack forming the laminations thus decreasing the magnetic flux concentration in the stator structure, thereby decreasing the flux concentration at a central zone of the stack to reduce the noise level of the machine in operation by decreasing cyclically recurring attraction forces upon rotation of the claw pole-type field structure.

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**4,110,643**

## INDUCTION MOTOR

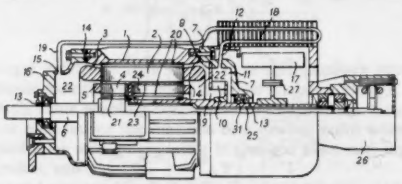
**Arnold Müller, Lichtensteinstr. 31, 7312 Kirchheim, Teck, Fed. Rep. of Germany**

**Filed Aug. 24, 1976, Ser. No. 717,733**

**Claims priority, application Fed. Rep. of Germany, Aug. 29, 1975, 2538561**

**Int. Cl.² H02K 9/19**

**U.S. Cl. 310—54** **6 Claims**



1. In a variable-speed electric induction motor, of that kind having a stator and a rotor, and means defining a hermetically sealed liquid flow circuit including internal space of the motor, a coolant liquid in said liquid flow circuit, and a pump located in said liquid flow circuit for pumping said coolant liquid in said liquid flow circuit, the improvement which comprises a free-running ancillary shaft, and drive means independent of the rotor of the motor for rotating said ancillary shaft at constant speed, said pump being coupled for driving to said ancillary shaft.

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**4,110,644**

## DYNAMOELECTRIC MACHINE END SHIELD ARRANGEMENT

**Joseph T. Roddy, Ballwin, Mo., assignor to Emerson Electric Co., St. Louis, Mo.**

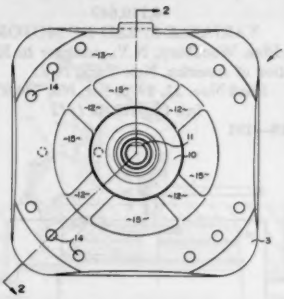
**Filed Aug. 2, 1976, Ser. No. 710,604**

**Int. Cl.² H02K 5/00**

**U.S. Cl. 310—91** **11 Claims**

1. In a dynamoelectric machine having a laminated stator core, a pair of end shields positioned on opposite ends of said laminated core, and a cementing composition bonding said end shields to said laminated core, the improvement comprising axially projecting mounting tabs connected to said end shields, said mounting tabs being adapted to encompass laminations of said laminated core, said tabs having a first end integrally formed with said end shield, a free second end, and an axial length therebetween, said axial length having a stepped construction including a first surface area, a second surface area, and a lateral edge between said first and said second surface areas, said first and said second surface areas being displaced from one another by a distance equal to the length of said lateral edge, oppositely opposed pairs of tabs of said end shields mating with one another, the lateral edges of said mating tabs lying approximately adjacent one another, said tabs

defining an aperture extending through said tab pair to a radially inner face of said tab pair when said end shields are in their



mated position, said aperture forming a passageway through the mated tabs.

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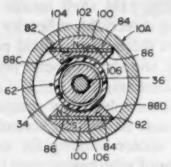
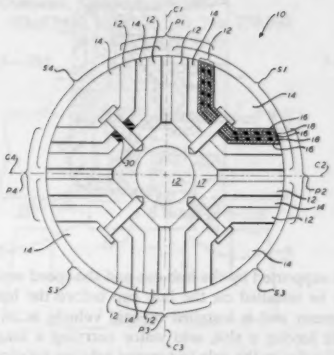
**4,110,645**
**ELECTRIC MOTOR**
**James R. Hendershot, Jr., Amherst, N.H., assignor to Vibrac Corporation, Chelmsford, Mass.**
**Filed Feb. 23, 1976, Ser. No. 660,237**
**Int. Cl.[2] H02K *21/26***
**U.S. Cl. 310—154** **3 Claims**



1. In a dynamo-electric machine of the type comprising a housing having a cross-section such that at least two oppositely disposed portions of the interior surfaces of said housing are curved in cross-section; a rotatable shaft mounted in said housing; a hollow armature concentrically mounted on said shaft so that a least a portion of said armature is radially spaced from said shaft; a stationary, magnetically-conductive core member extending into the space provided between said armature and said shaft; at least two substantially flat mutually spaced magnets secured within said housing and spaced radially from said armature; and at least two pole pieces of magnetically-conductive material, each of said pole pieces being secured to a different one of said magnets, said pole pieces extending toward and terminating short of said armature; wherein the improvement comprises:

at least two magnetically-conductive adaptors for securing said magnets to said housing, said adaptors being disposed between said magnets and said housing, each of said adaptors having a curved surface secured to and mating with a respective one of said interior surfaces of said housing and a substantially flat surface secured to and supporting at least one of said magnets.

**4,110,646**
**AC SYNCHRONOUS MOTOR HAVING AN AXIALLY LAMINATED ROTOR**
**S. Chandrasekhara Rao, Fairlawn, N.J., assignor to Bogue Electric Manufacturing Company, Paterson, N.J.**
**Filed Oct. 5, 1976, Ser. No. 730,260**
**Int. Cl.[2] H02K *19/00***
**U.S. Cl. 310—163** **4 Claims**



1. In an ac synchronous reluctance motor provided with a rotor having a central shaft along its axis of rotation and having a plurality of even-numbered rotor poles with each rotor pole having a pole center, wherein the pull-in torque, pull-out torque, power factor and efficiency of the motor are related to the ratio of direct axis reactance to the quadrature axis reactance of the motor, said ratio being predetermined for each such motor, the improvement comprising:

(a) a plurality of rotor segments with each rotor segment extending axially parallel to said axis of rotation and extending angularly from a pole center to an adjacent center and adjacent portions of adjacent rotor segments comprising one-half of a rotor pole;

(b) each of said rotor segments comprised of

(i) a plurality of magnetic sub-segments, and

(ii) a plurality of electrically conductive sub-segments interspersed with said magnetic sub-segments;

(c) each of said magnetic sub-segments comprised of

(i) a plurality of laminations of soft magnetic material extending axially parallel to the axis of said shaft, and

(ii) non-magnetic material extending axially parallel to the axis of said shaft and positioned intermediate the laminations of soft magnetic material,

(d) said laminations of soft magnetic material of said magnetic sub-segments providing decreased direct axis reluctance thereby increasing the direct axis reactance and said non-magnetic material of said magnetic sub-segments providing increased quadrature reluctance thereby decreasing quadrature axis reactance whereby the ratio of direct axis reactance to quadrature axis reactance is increased and the pull-in torque, pull-out torque, power factor and efficiency of the ac synchronous reluctance motor are improved.

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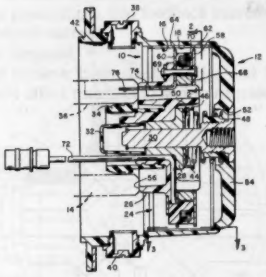
**4,110,647**
**WHEEL SPEED SENSOR**
**Ralph Gilbert Eslinger, and John Millar Nicolson, both of Elyria, Ohio, assignors to The Bendix Corporation, Southfield, Mich.**
**Filed Jan. 13, 1977, Ser. No. 759,170**
**Int. Cl.[2] H02K *19/20***
**U.S. Cl. 310—168** **15 Claims**

1. In a vehicle having an axle and a wheel rotatably mounted on said axle, a hub cap covering the end of said axle, a speed sensor assembly comprising a rotor mounted for rotation with

said hub cap and a stator carried by said hub cap and including sensing means responsive to relative rotation between the rotor and the stator for generating a signal proportional to the rate of relative rotation between the rotor and the stator, a spindle carried by the hub cap and rotatable therewith, a bearing carried by the stator rotatably receiving said spindle so that the



stator is supported by the hub cap and the speed sensor assembly can be installed on the hub cap before the hub cap and speed sensor unit is installed on said vehicle as an assembly, said axle having a slot, said stator carrying a tang received within the slot in the axle to prevent relative rotation between the stator and the axle.

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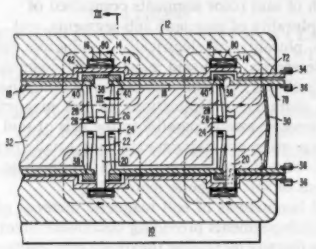
**4,110,648**

## HOMOPOLAR MACHINE FOR REVERSIBLE ENERGY STORAGE AND TRANSFER SYSTEMS

**Roy E. Stillwagon, South Huntington Township, Huntington County, Pa., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Jun. 10, 1975, Ser. No. 585,642**
**Int. Cl.[2] H02K *11/00***
**U.S. Cl. 310—178** **14 Claims**



1. A homopolar generator-motor comprising:

a base supporting a stator and a rotor arranged to rotate therein;

stationary excitation winding means on said stator which provides flux linking said rotor;

said rotor comprising a rotatable hollow sleeve supported at its opposite ends from pedestals extending upwardly from said base;

a stationary iron core in said hollow sleeve, the ends of said core being mounted on said pedestals;

slip rings on the opposite ends of said sleeve;

current collecting means supported from said stator and positioned to contact said slip rings for collecting current generated in said sleeve;

stationary conductor means mounted on but insulated from the stator, and means connecting said conductor means to the current collecting means;

means connecting said current collecting means and stationary conductor means to a load for transferring current from said sleeve to said load.

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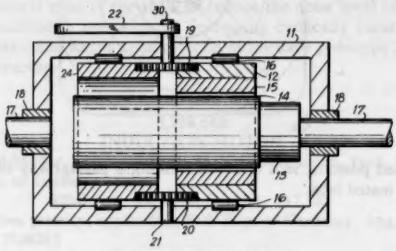
**4,110,649**

## VARIABLE SPEED DC MOTOR

**Joseph A. Mas, Woodbury, N.Y., assignor to Electric Vehicle Corporation of America, New York, N.Y.**

**Filed Nov. 22, 1976, Ser. No. 744,074**
**Int. Cl.[2] H02K *1/12***
**U.S. Cl. 310—191** **7 Claims**



1. A variable speed DC motor contained within a housing having bearing openings at each end, an armature disposed in the housing and pivoted in the bearing openings, the improvement comprising:

first cylindrical field shell means surrounding the armature and having at least a pair of oppositely disposed magnetic field pole segments mounted in said shell means facing the armature;

second cylindrical field shell means surrounding the armature and having at least a pair of oppositely disposed magnetic field pole segments mounted in said shell means facing the armature;

means mounting to each of said shell means for independent rotation within said housing and around said armature;

gear means coupling said shell means for rotation of the latter in opposite directions, whereby to vary the angular spacing between the magnetic field pole segments of the first shell means and the magnetic field pole segments of the second shell means;

and control means for selectively rotating said shell means, said control means having an actuating portion located outside of said motor housing for control of said shell means exteriorly of said motor.

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**4,110,650**

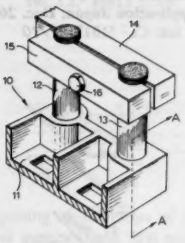
## BRUSHHOLDER SUPPORTING STRUCTURE

**Grey Charles Kemp, and Eion Murray Spence, both of Peterborough, Canada, assignors to Canadian General Electric Company Limited, Toronto, Canada**

**Filed Feb. 25, 1976, Ser. No. 661,303**
**Claims priority, application Canada, May 14, 1975, 226877**
**Int. Cl.[2] H02K *13/00***
**U.S. Cl. 310—239** **6 Claims**

1. A brushholder adapted to be secured to the frame of a dynamoelectric machine and insulated therefrom by means of cylindrical studs said brushholder having a frame containing at least two round holes spaced apart in parallel relation, each of said holes being defined by a wall surface of said frame having a predetermined diameter that is smaller than the outside diameter of one end of an insulated steel stud so that said wall surface is adapted to capture such a steel stud in an interference fit, groove means comprising a course pitch helical groove of shallow rectangular form in the wall surface defining each of said holes, a generally cylindrical resin bonded fiber glass stud one end of which has an outside diameter slightly less than said predetermined diameter, said one end of the fiber glass stud being disposed in a first one of said holes, and an adhesive for

bonding said fiber glass stud to the remaining wall surface and to the groove means of said first one of said holes, said groove means being of a size that takes away just enough area of the wall surface defining each of said holes to provide a good



adhesive bond between a fiber glass stud and the brushholder frame without detracting significantly from the interference fit of an insulated steel stud that can alternatively be installed in any of said holes.

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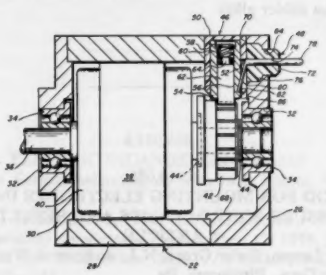
**4,110,651**

## BRUSH BLOCK ASSEMBLY

**Louis E. Fagan, Broomall, Pa., assignor to Litton Systems, Inc., Beverly Hills, Calif.**

**Filed Mar. 17, 1977, Ser. No. 778,573**
**Int. Cl.² H02K *13/00***
**U.S. Cl. 310—239** **4 Claims**



1. In a miniaturized electric motor having a commutator, the improvement comprising:

a passageway in said motor between the exterior thereof and said commutator, said passageway being quadrilateral in cross section;

a cartridge subassembly having a quadrilateral cross section slideably mounted in said passageway;

a latching terminal subassembly mounted between said passageway and the exterior of said motor;

said cartridge subassembly including a conductive brush having a quadrilateral cross section, a conductive cartridge formed as a quadrilateral tube for slideably receiving said brush, said cartridge having a surface with a notch therein, and an insulated housing formed as a quadrilateral tube for receiving said cartridge, said housing having a side with a slotted aperture therein;

said latching terminal subassembly including an insulated bushing, and a terminal mounted within said bushing having a terminal portion on the exterior of said motor and a flattened latch portion offset at an angle to the axis thereof extending into said passageway;

said flattened latch portion extending through said slotted aperture in said insulated housing and engaging said notch in said conductive cartridge to locate and prevent withdrawal of said cartridge subassembly from said motor passageway with said brush engaging said commutator to establish electrical contact between said brush and said exterior portion of said terminal.

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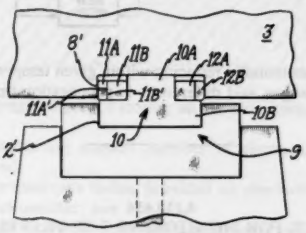
**4,110,652**

## MOUNTING ASSEMBLY FOR LAMINATED ROTOR RIM OF DYNAMOELECTRIC GENERATOR ROTATABLE ABOUT INCLINED SHAFT

**William J. McGahern, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Mar. 16, 1977, Ser. No. 778,096**
**Int. Cl.² H02K *1/22***
**U.S. Cl. 310—261** **7 Claims**



1. A rotor for a dynamoelectric generator comprising a spider sub-assembly that is rotatable around a non-vertical axis, a first plurality of axial keyways formed at spaced points around the circumference of said spider sub-assembly, a laminated rim disposed around said spider, a second plurality of axial keyways formed at spaced points around the inner circumferential surface of said laminated rim, each keyway of said second plurality being positioned generally in axial alignment, respectively, with each keyway of said first plurality, and a plurality of articulated key assemblies positioned with a portion of each key assembly respectively in each of said generally aligned pairs of keyways to prevent relative tangential movement of the laminated rim relative to the spider, each of said key assemblies comprising a generally T-shaped base member and two pairs of tapered wedge keys, each of the T-shaped base members being mounted in radial compression between the spider sub-assembly and said laminated rim, and each of said pairs of wedge keys being mounted in wedging relationship, respectively, on opposite sides of the neck of a respective one of said T-shaped base members, between it and the rim laminations, with the thickest portions of each wedge key positioned respectively adjacent opposite sides of the rotor rim, thereby to hold the rim laminations in alignment along the keyways in the rim and to fix said laminations in position relative to the spider.

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**4,110,653**

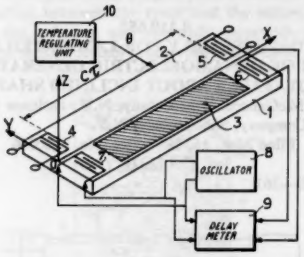
## METHOD OF MODIFYING THE TEMPERATURE DRIFT OF THE PROPAGATION TIME OF SURFACE ELASTIC WAVES AND A DEVICE OBTAINED BY SAID METHOD

**Pierre Hartemann, Paris, France, assignor to Thomson-CSF, Paris, France**

**Filed Mar. 25, 1977, Ser. No. 781,451**
**Claims priority, application France, Mar. 30, 1976, 76 09210**
**Int. Cl.² H01L *41/10***
**U.S. Cl. 310—313** **7 Claims**

1. A method of reducing the differences in propagation time of surface elastic waves ascribed to variations in temperature of a crystalline substrate propagating said surface elastic waves, said method comprising the steps of cutting the crystalline substrate in accordance with a predetermined crystal cut, and in subjecting at least one superficial zone of the substrate, located in the trajectory of said waves, to an ion bombardment; said ion bombardment permanently altering the regular lattice

arrangement of the atoms of said crystalline substrate; the intensity and the extent of said ion bombardment being adjusted for substantially reducing within given temperature and frequency ranges, said differences in propagation time.

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**4,110,654**

## DEVICE FOR MONITORING THE TRAVEL OF YARN-LIKE STRUCTURES AT A TEXTILE MACHINE

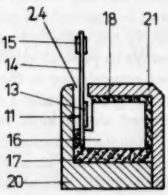
**Andreas Paul, Uetikon am See, Switzerland, assignor to Gebr. Loepfe AG, Zurich, Switzerland**

**Filed Jun. 23, 1975, Ser. No. 589,627**

**Claims priority, application Switzerland, Jul. 12, 1974, 9630/74**

**Int. Cl.² H01L *41/10***

**U.S. Cl. 310—323** **3 Claims**




1. A device for monitoring the travel of yarn-like structures at a textile machine, comprising:

a yarn scanning structure including a plate-shaped cantilever member which can be excited into oscillation by the traveling yarn-like structure, and mechano-electrical transducing means responsive to such oscillation;

said plate-shaped cantilever member having an upper edge and opposite thereto a lower edge, yarn guiding means provided adjacent said upper edge;

a rigid base structure having a mass greater than the mass of said yarn scanning structure, said lower edge of the plate-shaped cantilever member being rigidly connected with said rigid base structure;

a hollow casing receiving said rigid base structure and said lower edge of the plate-shaped cantilever member, said hollow casing having a slot for exposing said yarn guiding means to the traveling yarn-like structure;

soft elastic means arranged between and adjacent said hollow casing and the rigid base structure for preventing transfer of mechanical shock and vibration from the textile machine to the yarn scanning structure; and

said cantilever member is a piezoelectric transducer element and said yarn guiding means is an elongated body made of hard material and fixedly attached to the free upper end of said piezoelectric transducer element.

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**4,110,655**

## PIEZO ELECTRIC VIBRATOR UNIT SEALED WITH 90SN-10AU SOLDER

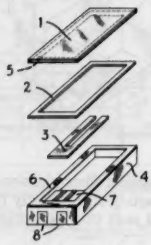
**Morinaka Hata, and Isao Shinoda, both of Tokyo, Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan**

**Filed Dec. 23, 1976, Ser. No. 753,847**

**Claims priority, application Japan, Dec. 26, 1975, 50-157588**

**Int. Cl.² H01L *41/10***

**U.S. Cl. 310—344** **7 Claims**




1. A vibrator unit for use in a timepiece and the like comprising: a ceramic case having closed bottom and sidewall portions and an open top portion; a vibrator mounted to undergo vibration within said ceramic case; a lid disposed over the open top portion of said ceramic case; and means airtightly sealing together said lid and ceramic case, said means consisting of a soldering washer soldered between opposing surface portions of said lid and ceramic case and consisting essentially of 90Sn–10Au solder alloy.

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**4,110,656**

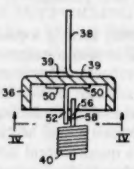
## METHOD FOR MOUNTING ELECTRODES IN HIGH PRESSURE SODIUM LAMPS AND RESULTING ARTICLE

**Daniel A. Larson, Cedar Grove, N.J., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Jan. 13, 1977, Ser. No. 758,978**

**Int. Cl.² H01J *5/50***

**U.S. Cl. 313—331** **4 Claims**




1. An electrode mount for a high pressure sodium discharge lamp comprising:

an electrode support having a flattened end portion,

a thin niobium wire welded to said flattened end portion of said electrode support, and

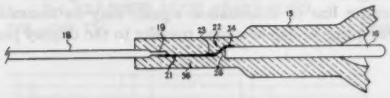
a discharge sustaining electrode including an electrode rod, said electrode rod being welded to said electrode support through said thin metal wire with the axis of said electrode rod positioned perpendicular to the axis of said thin metal wire with said thin metal wire partially surrounding said electrode rod.

4,110,657

## LEAD-IN SEAL AND LAMP UTILIZING SAME

John C. Sobieski, Richmond Heights, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 14, 1977, Ser. No. 776,850
Int. Cl.[2] H01J 5/36
U.S. Cl. 313—332 13 Claims



7. A lamp comprising an envelope of vitreous material, a conductive foil seal member, and first and second elongated electrical conductors, said foil seal member and conductors being aligned substantially axially with the foil seal member between the conductors, and means connecting the conductors to the foil seal member at opposed ends thereof, at least one of said means comprising an axial spacing between the foil seal member and one of said conductors, a conductive foil tab member extending substantially axially between the foil seal member and the last-mentioned conductor and connected thereto at respective opposed ends of the tab member, said foil seal member being hermetically sealed in said material of the envelope, said first elongated conductor extending within said envelope and said second elongated conductor extending out of said envelope.

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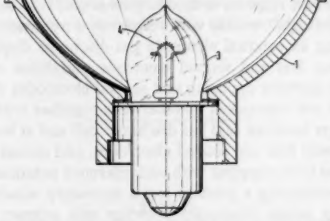
4,110,658

## ELECTRIC INCANDESCENT LAMP

Knut Otto Sassmannshausen, 5, Pinewood Estate, Wexford, Ireland

Filed Dec. 9, 1976, Ser. No. 749,061
Claims priority, application Ireland, Dec. 17, 1975, 2749/75
Int. Cl.[2] H01J 1/16; H01K 1/14; H01J 19/10
U.S. Cl. 313—344 14 Claims



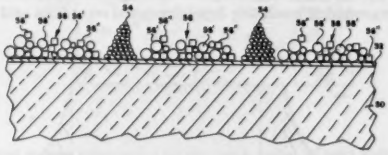
1. In an electric incandescent lamp, having a rotational axis, a filament formed with a coil disposed in bowed form across the axis of the lamp, the length CL of said coil, measured along the mean curvature ML of said coil, being 3.6 to 6.2 times greater than the outside diameter OD of said coil and the height H of said coil, measured in the direction of the axis of said lamp, being 1.2 to 2.5 times greater than the outside diameter of said coil, and the distance A between each of the windings of the filament of said coil, measured along the mean curature ML of said coil, being 0.3 to 1.2 times as great as the diameter WD of the filament of said coil.

4,110,659

## CATHODE RAY TUBE STORAGE TARGET HAVING INCREASE LIFE

William Miller Mason, Sherwood, and Gerald Emmett McTeague, Portland, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Feb. 18, 1976, Ser. No. 658,977
Int. Cl.[2] H01J 29/39, 29/41
U.S. Cl. 313—398 16 Claims



1. A storage target for storing an electron image, comprising:

a nonconducting support member of electrical insulative material;

collector electrode means provided on one surface of said support member; and

a storage dielectric layer extending along said collector electrode means and containing a mixture including storage dielectric material and rare earth material selected from the group consisting of a rare earth oxide, a rare earth oxysulfide and a rare earth activated rare earth oxide or oxysulfide.

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4,110,660

## LUMINESCENT BARIUM-LITHIUM ALUMINATE PHOSPHORS AND LAMP CONTAINING THE SAME

Robert W. Wolfe, Towanda, Pa., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Continuation of Ser. No. 559,692, Mar. 19, 1975, abandoned.
This application Sep. 27, 1976, Ser. No. 727,231
Int. Cl.[2] C09K 11/46
U.S. Cl. 313—486 7 Claims

1. A luminescent composition consisting essentially of (a) host consisting essentially of from about 2 to about 8 mole percent of barium oxide, from about 0.5 to about 20 mole percent of lithium oxide, and from about 80 to about 97.5 mole percent of aluminum oxide, said oxides being calculated on the basis of BaO, $\frac{1}{2}Li_2O$, and $\frac{1}{2}Al_2O_3$ respectively, and (b) as an activator from an effective amount to about 0.2 moles per mole of host of divalent europium and from an effective amount to about 0.45 moles per mole of host of divalent manganese, said effective amounts being sufficient to yield a green luminescence at about 515±2nm when said composition is excited by ultraviolet light and wherein lithium is present in an amount not greater than 1% by weight.

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4,110,661

## LIGHT EMITTING DEVICE FOR OPTICAL COMMUNICATIONS

James S. Harris, Jr.; Richard C. Eden, both of Thousand Oaks; Earl S. Cory, Camarillo, and Fred W. Scholl, Thousand Oaks, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

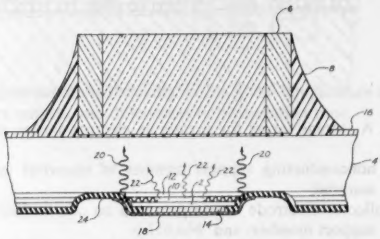
Filed Apr. 1, 1977, Ser. No. 783,882
Int. Cl.[2] H05B 33/16, 33/24
U.S. Cl. 313—499 5 Claims

2. A light emitting device comprising:

a mesa formed on a semiconductive substrate, said mesa having a top layer of semiconductive material of one conductivity type, a light emitting active layer of semiconductive material of said one conductivity type forming a first heterojunction with said top layer, a third layer of semiconductive material of opposite conductivity type

forming a second heterojunction with said active layer opposite said first heterojunction, and wherein said substrate is of opposite conductivity type and forms a junction with said third layer, the semiconductive material of said active layer having a bandgap smaller than the bandgap of the semiconductive material of the other layers and having a refractive index different than the refractive index of the adjacent layers so that some light is confined to travel within said active layer toward the wall of said mesa, said mesa having walls which encircle it and which traverse said active layer at an angle of substantially 45°;

a transparent insulating layer deposited on at least said walls;



contacts coupled to said top layer and said substrate for applying an electrical signal across said active layer so that light is emitted from said active layer;

a top mirror adjacent said top layer for reflecting light toward said substrate;

a side mirror deposited on said insulating layer, said side mirror intersecting the plane of said active layer at substantially 45° so that light from said active layer striking said side mirror is reflected toward said substrate; and

an optical fiber having an end coupled to said substrate opposite said active layer, the area of said end being substantially the same or larger than the area of said active layer, whereby the light reflected by said side reflecting mirror is received by said fiber.

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**4,110,662**

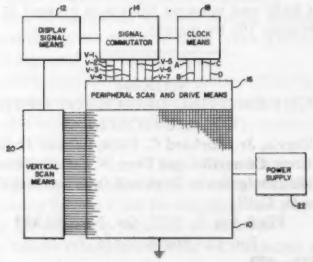
## THIN-FILM ANALOG VIDEO SCAN AND DRIVER CIRCUIT FOR SOLID STATE DISPLAYS

**Edwin W. Greeneich, Plum Borough, and Juris A. Asars, Murrysville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Jun. 14, 1976, Ser. No. 695,676**

**Int. Cl.[2] H05B *33/12, 39/06;* G06F *3/14;* H04N *5/66***

**U.S. Cl. 315—169 TV** **4 Claims**




1. A display information signal scan and drive means for processing line-at-a-time display signals for an X-Y matrix coincidence addressable display panel in which "*n*" information signal inputs are connected to the scan and drive means having "*m*" information signal outputs which are connected to respective X or Y panel buses and wherein $m>>n$, which scan and drive means comprises parallel networks of decoding means and switching transistor means, with individual information storage means being associated with each switching transistor means, which scan and drive means effects conversion of serial format information signals to parallel format information signals by sequential activation of switching transistor networks with "*n*" switching transistors present in each network being simultaneously actuated to transfer the information signal to the respective associated storage means, so that an entire line of information signals may be assembled and stored prior to line-at-a-time transfer to the display panel.

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**4,110,663**

## PLASMA DISPLAY PANEL DRIVING CIRCUIT INCLUDING APPARATUS FOR PRODUCING HIGH FREQUENCY PULSES WITHOUT THE USE OF CLOCK PULSES

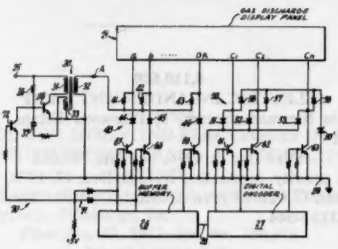
**Togo Miyazaki, and Masatoshi Shimizu, both of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan**

**Filed Oct. 21, 1976, Ser. No. 734,420**

**Claims priority, application Japan, Oct. 22, 1975, 50-127188**

**Int. Cl.[2] H05B *41/14***

**U.S. Cl. 315—169 TV** **16 Claims**

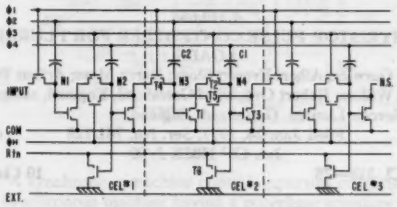



1. A circuit responsive to d.c. power and first and second control voltages variable with respect to a reference potential for driving an external electrode gas discharge display panel comprising first and second electrode pluralities, each first electrode spatially opposing said second electrodes with a gas discharge cell interposed therebetween together with an insulating layer between said gas discharge cell and at least one of said opposed first and second electrodes, said circuit comprising a point to be supplied with said reference potential, a transformer comprising a primary and a secondary winding, pulse producing means connected between said primary winding and said point for producing a sequence of pulses having positive and negative components reaching a first and a second predetermined voltage which are positive and negative with respect to said reference potential, first means connected to said point and responsive to said first control voltages for supplying said first electrodes substantially with said pulses or with a preselected ones of said positive or negative components of said pulses dependent upon said first control voltages, and second means connected to said point and responsive to said second control voltages for selectively supplying said second electrodes with a third predetermined voltage and said reference potential.

## 4,110,664
## ELECTROLUMINESCENT BARGRAPH WITH INTEGRAL THIN-FILM TRANSISTOR CONTROL CIRCUITRY

**Juris A. Asars, Murrysville; David H. Davies, Wilkins Township, Allegheny County, and Thomas P. Brody, Pittsburgh, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Apr. 15, 1977, Ser. No. 787,801**
**Int. Cl.[2] H05B** *37/00, 39/00, 41/00*
**U.S. Cl. 315—169 TV** **6 Claims**




1. An electroluminescent bargraph comprising
(a) an insulating elongated rectangular substrate;
(b) an elongated rectangular array of a plurality of electroluminescent display elements disposed upon the substrate, which display elements comprise an individual display element electrode, a layer of electroluminescent phosphor, and a common light transmissive electrode extending over the area of the entire array;
(c) a thin-film transistor multi-stage dynamic shift register addressing means disposed upon the substrate adjacent to and interconnected with the display elements, with the number of stages of the shift register equal to the number of display elements and an individual stage operatively connected to an individual display element, wherein each stage of the multi-stage dynamic shift register has a refresh-hold transistor interconnecting a first and second half stage, and each stage is connected to a switching transistor with the stage output connected to the gate of the switching transistor, and wherein one switching transistor contact is connected to an individual display element electrode of the display element and the other contact is connected to the display medium power supply, whereby the output signal of the shift register stage controls the actuation of the display element; and
(d) drive signal input buses disposed at a peripheral side of the substrate connected to the shift register addressing means.

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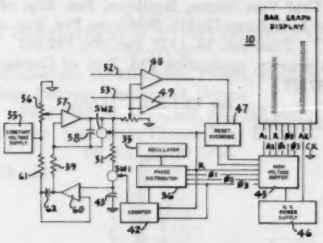
## 4,110,665
## CONTROL CIRCUIT FOR BAR GRAPH DISPLAY PANEL

**James O. Moore, Worcester Township, Montgomery County, Pa., assignor to Moore Products Co., Spring House, Pa.**

**Filed Jul. 13, 1977, Ser. No. 815,101**
**Int. Cl.[2] H05B** *37/00, 39/00, 41/00*
**U.S. Cl. 315—169 TV** **8 Claims**

1. An electronic circuit for controlling a bar graph display comprising
generating means for producing a ramp voltage that increases at a constant rate,
restoring means for periodically terminating said voltage increase and reducing said voltage to a predetermined initial value,
timing means for controlling the period of said reducing action, and




control means responsive to the peak value of said voltage for adjusting said rate to maintain said peak value at a predetermined magnitude.

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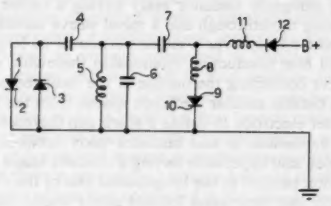
## 4,110,666
## CIRCUIT FOR GENERATING A SAW TOOTH WAVEFORM

**Attilio Farina, Turin, Italy, assignor to Indesit Industria Elettrodomestici Italiana S.p.A., Italy**

**Filed Dec. 3, 1976, Ser. No. 747,145**
**Claims priority, application Italy, Dec. 11, 1975, 70041 A/75**
**Int. Cl.[2] H01J** *29/70*
**U.S. Cl. 315—408** **9 Claims**




1. A circuit for generating a periodic saw-tooth waveform in a coil, such as the deflection coil of a television picture tube, comprising:
a first circuit branch across which said deflection coil is connected, said first circuit branch including an energy storing current source, and a first electronic switch having a control electrode to which are fed control pulses which make said switch conductive during a part of the ramp portion of the saw-tooth waveform,
a second branch of the circuit across which said deflection coil is also connected, said second circuit branch comprising:
a second current source,
a first reactance connected in series between said deflection coil and said second current source,
a second electronic switch, and
a second reactance connected in series with said second electronic switch between said second current source and said second electronic switch and also between said first reactance and said second electronic switch, said second electronic switch being fed with pulses which initiate the flyback portion of said saw-tooth waveform by turning on said second electronic switch towards the end of the ramp portion of said saw-tooth waveform to connect said first and second reactances to form a resonant circuit.

**4,110,667**

## PROCESS FOR CLEANING SPARK PLUGS ON INTERNAL COMBUSTION ENGINES

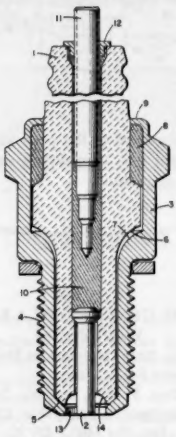
**Siegbert Graf Vom Hagen, Bensheim, Fed. Rep. of Germany, assignor to Kyberna GmbH, Bensheim, Fed. Rep. of Germany**

**Filed Jul. 28, 1975, Ser. No. 599,667**

**Claims priority, application Fed. Rep. of Germany, Aug. 2, 1974, 2437257**

**Int. Cl.² H01T *13/20***

**U.S. Cl. 313—143** **10 Claims**



1. A spark plug comprising:

(a) an elongated insulator body having a center electrode passing therethrough and a metal sleeve surrounding the insulator body over a major portion of its length and in good heat conducting relationship therewith, said metal sleeve contacting the outside of the insulated body;

(b) an outside annular electrode spaced from the end of the center electrode to define a spark gap therebetween; and

(c) a depression in said insulator body between the electrodes, said depression having a concave shape in a cross-section parallel to the longitudinal axis of the center electrode, said depression located solely within the limits of said insulator body and said metal sleeve having a shape other than one forming a contiguous line with said depression, the surface of said depression being below the line directly connecting the center electrode and the outside annular electrode.

10. A process for removing deposits of combustion residues from the ceramic insulator body of a spark plug located in an engine cylinder during operation of the engine comprising:

(a) producing a spark across a gap of at least one mm with a current of at least 70 mA and a voltage of 20 kV;

(b) deflecting said spark by means of a flow of gas in the engine cylinder combustion space against the end of said insulator body; and

(c) maintaining said insulator body at approximately the engine coolant temperature by a sleeve which surrounds it, said sleeve having threads on the outer periphery thereof for securing said spark plug in place, said spark plug further comprising:

(1) an elongated insulator body having a center electrode passing therethrough and a metal sleeve surrounding the insulator body over a major portion of its length and in good heat conducting relationship therewith, said metal sleeve contacting the outside of the insulated body;

(2) an outside annular electrode spaced from the end of the center electrode to define a spark gap therebetween; and

(3) a depression in said insulator body between the electrodes, said depression having a concave shape in a cross-section parallel to the longitudinal axis of the center electrode, said depression located solely within the limits of said insulator body and said metal sleeve having a shape other than one forming a contiguous line with said depression, the surface of said depression being below the line directly connecting the center electrode and the outside annular electrode.

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**4,110,668**

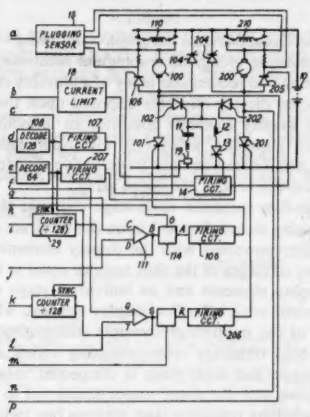
## THYRISTOR PULSE CONTROLLER FOR PLURAL LOADS

**David Gurwicz; Albert Everett Sloan; Barry Moss; Arthur Wild, and William Robert Ord, all of Gateshead, England, assignors to Sevcon Limited, Gateshead, England**

**Filed Jan. 24, 1977, Ser. No. 761,725**

**Int. Cl.² H03K *3/00***

**U.S. Cl. 318—78** **10 Claims**

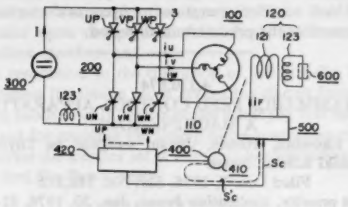



1. A pulse controller for controlling the mean current supplied to each of a plurality of d.c. loads, comprising a plurality of main thyristors for connection in series between respective loads and a d.c. supply, respective firing circuits for the main thyristors and commutation circuit means for commutating the main thyristors, a clock pulse generator adapted to provide a series of clock pulses at a basic clock rate, commutation control circuit means including counting means arranged to count the clock pulses and to effect commutation of each main thyristor at successive instants separated by a time interval corresponding to a predetermined count of the counting means, firing control circuit means adapted to provide for each main thyristor a control signal at a preset time in each time interval between successive commutations of the thyristor, further counting means associated with at least one of the main thyristors and arranged to provide an output signal at a count equal to the said predetermined count, and differential control circuit means adapted to cause the further counting means to begin counting at the basic clock rate at the start of each time interval and on receipt of a control signal from the firing control circuit means to stop counting at the basic rate and to continue counting at a rate higher than the basic clock rate by a factor determined by the differential control circuit means, the said output signal being provided when the total count equals the said predetermined count, the main thyristor associated with the further counting means being fired into conduction on receipt by the associated firing circuit of the said output signal from the further counting means.

## 4,110,669
## SYNCHRONOUS MACHINE CONTROL SYSTEM

Masahiko Akamatsu, Amagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Amagasaki, Japan

Filed Nov. 24, 1976, Ser. No. 744,593
Claims priority, application Japan, Jan. 28, 1976, 51-8145
Int. Cl.[2] H02K *29/00*
U.S. Cl. 318/175 13 Claims

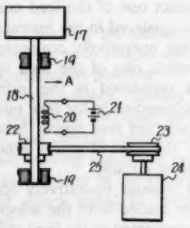



1. A synchronous machine control apparatus comprising:
a synchronous machine having a polyphase armature winding and a first DC excitation winding;
a static switch converter having a plurality of AC output terminals connected to said armature winding and a plurality of DC input terminals for connection to a power source, and consisting of a plurality of static switches, each static switch connected between one of said AC output terminals and one of said DC input terminals;
commutation control means for changing current flow from at least one of said static switches to at least one of the others of said static switches to provide commutation for a part of said armature winding;
DC power supply means for supplying a DC current to said first DC excitation winding;
said DC power supply means including current increment means for incrementing the current in said first DC excitation winding in synchronous relationship with said commutation to induce an auxiliary electromotive force in the part of said armature winding engaging in said commutation;
whereby said commutation is assisted by said current increment means.

## 4,110,670
## BRAKING APPARATUS

Tetsuro Araki, and Hideaki Hayashi, both of Mitaka, Japan, assignors to Nippon Columbia Kabushikikaisha, Tokyo, Japan

Filed May 19, 1977, Ser. No. 798,343
Claims priority, application Japan, May 20, 1976, 51-63413
Int. Cl.[2] D01H *7/22*
U.S. Cl. 318—212 8 Claims

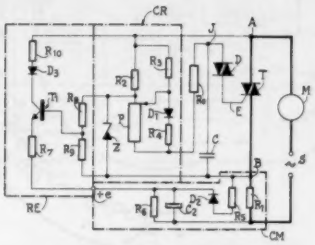



1. A brake apparatus for rotating body comprising:
a. bearing means for rotatably supporting a rotary shaft to which a load to be rotated is fixed; and
b. biasing means located near said shaft for biasing said shaft in the direction to said bearing means to cause frictional force between said shaft and bearing means so as to brake said load.

## 4,110,671
## SPEED VARIATOR FOR A UNIVERSAL ELECTRIC MOTOR

Jean Roger, Conflans Ste Honorine, France, assignor to Aciers et Outillage Peugeot, Audincourt, France

Filed May 18, 1977, Ser. No. 797,958
Claims priority, application France, May 18, 1976, 76 14942
Int. Cl.[2] H02P *5/40*
U.S. Cl. 318—227 8 Claims




1. A speed variator for a single-phase a.c. motor comprising a triggerable silicon-controlled rectifier component having a control electrode and terminals for connection in series with said motor to an a.c. current source, a phase-shifting circuit having terminals and connected to the terminals of said rectifier component and comprising a capacitive branch and a resistive branch having a part and a regulating potentiometer having a slide and inserted in said part, said two branches having a junction connected to the control electrode of said rectifier component, a unidirectional semiconductor component responsive to voltage connected in parallel with said capacitive branch and said part of said resistive branch in which said potentiometer is inserted, said resistive branch comprising connected in parallel a first branch comprising a first resistor and said potentiometer interconnected at a junction point and a second branch comprising a second resistor and a third resistor, said second resistor and said third resistor having a point of junction connected to the slide of said potentiometer, said voltage responsive unidirectional component being connected to the point of junction between said potentiometer and said first resistor.

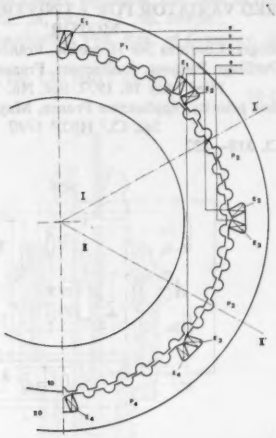
## 4,110,672
## POSITION CODER USED WITH A MACHINE OF VARIABLE RELUCTANCE

Michel Deplante, Paris, and Didier Minesi, Saint Fargeau-Ponthierry, both of France, assignors to Engins Matra, Paris, France

Filed Apr. 9, 1976, Ser. No. 675,623
Claims priority, application France, Apr. 14, 1975, 75 11585
Int. Cl.[2] H02K *23/00*
U.S. Cl. 318—254 9 Claims

1. A shaft position coder comprising:
a stator having disposed thereon first and second exciter coils and a detector coil magnetically coupled to said first and second exciter coils;
means for applying an alternating current voltage to said first and second exciter coils electrically coupled to said exciter coils for causing said first exciter coil to induce a first polarity alternating current voltage in said detector coil and for causing said second exciter coil to induce a second opposite polarity alternating current voltage in said detector coil;
a rotor disposed in proximity to said exciter and detector coils and operative to alter the magnetic coupling between

each exciter coil and the detector coil in response to the angular position of said rotor with respect to said stator to vary the relative amplitudes of the first and second polarity voltages induced in said detector coil; and

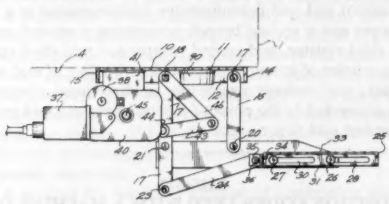


means electrically coupled to said detector coil and responsive to the voltages induced in said detector coil for determining the relative position of said rotor and said stator.

## 4,110,673
## EXTENDABLE VEHICLE STEP AND STEP MOTOR CONTROL SYSTEM

**Emery James Nagy, Yoncalla, Oreg., and Rodney A. MacDonald, Palos Verdes Est., Calif., assignors to Kwikee Enterprises, Inc., Drain, Oreg.**

**Filed Jul. 19, 1976, Ser. No. 706,539**
**Int. Cl.[2] H02P *3/08***
**U.S. Cl. 318—466** **4 Claims**

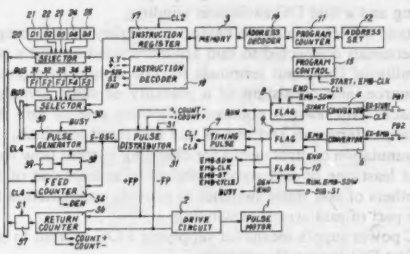


1. A positionable step for vehicles, said step comprising,
a base adapted for attachment to the vehicle,
a step extensible from a stowed position beneath the base to an extended position whereat the step is downwardly and outwardly offset from the vehicle,
step support members swingably postionable from a stowed position beneath the base,
cooperating means carried by said step and said support members and slidably supporting the step for lengthwise travel along said support members during step extension and retraction,
front and rear pairs of links coupling said step support members and said step to the base so as to permit swinging movement of the step and step support members, said rear pair of links each including lowermost arm portions imparting sliding motion to said step for travel lengthwise along said support members, and
step actuating means carried by said base including a reversible electric motor in driving connection with the rear pair of links and a motor control system operable to determine fixed intervals of motor operation constituting step extension and retraction regardless of stalling of the motor by a step obstruction, said motor control system includes semiconductor controlled rectifiers, one of said rectifiers having its cathode in a switch controlled circuit with said motor, capacitor means in circuit with said cathode of said one rectifier, said capacitor means discharging after a predetermined period to momentarily change the charge on said cathode to a negative charge thereby terminating said one rectifier operation to open said circuit to the motor after the predetermined period.

## 4,110,674
## PROGRAMMABLE FEED CONTROL APPARATUS FOR A MACHINE TOOL

**Minoru Enomoto, Handa, Japan, assignor to Toyoda-Koki Kabushiki Kaisha, Japan**

**Filed Dec. 7, 1976, Ser. No. 748,272**
**Claims priority, application Japan, Jan. 30, 1976, 51-9499**
**Int. Cl.[2] G05B *19/24***
**U.S. Cl. 318—571** **9 Claims**



1. A programmable feed control apparatus for moving a machine member of a machine tool comprising:
a program memory for memorizing a plurality of control data for control of a feed movement of the machine member at memory addresses thereof;
a program counter operatively connected to the program memory for reading out the control data stored in the program memory;
an instruction register operatively connected to the program memory for registering the control data designated by the program counter;
first presetting means for digitally presetting feed amounts through which the machine member is to be moved;
second presetting means for digitally presetting feed speeds of the machine member;
a feed pulse generating circuit for generating a train of feed pulses;
a first selector operatively connected to the instruction register to select one of the feed amounts designated by control data registered in the instruction register;
a second selector operatively connected to the instruction register to select one of the feed speeds designated by control data registered in the instruction register and operatively connected to the feed pulse generating circuit to load the selected feed speed thereinto to determine a frequency of the train of pulses generated from the feed pulse generating circuit;
a feed control counter operatively connected to the first selector to be loaded with the selected feed amount and operatively connected to the feed pulse generating circuit to receive the train of feed pulses to subtract the content thereof;
the feed control counter generating a signal when the content thereof becomes zero;
a drive circuit operatively connected to the feed pulse generating circuit to receive the train of feed pulses;

a servo motor operatively connected to the drive circuit for moving the machine member;

a timing pulse generating circuit for generating a set of timing pulses to enable control data stored in the program memory to be transferred;

a first flip flop set by completion of generation of a set of timing pulses from the timing pulse generating circuit to enable the feed pulse generating circuit to generate a train of feed pulses to perform a feed movement of the machine member and reset by the signal from the feed control counter upon completion of the feed movement of the machine member; and

means responsive to the operation of the first flip flop for inhibiting the timing pulse generating circuit from generating another set of timing pulses while the first flip flop is set and for enabling the timing pulse generating circuit to generate the another set of timing pulses immediately after the first flip flop is reset.

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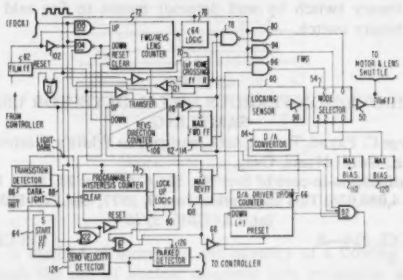
**4,110,675**

## RETURN AND POSITION CONTROL FOR A DC SERVO SYSTEM

**Daniel A. Wisner, Milan, Mich., assignor to Burroughs Corporation, Detroit, Mich.**

**Filed Jun. 8, 1977, Ser. No. 804,552**
**Int. Cl.² G05B *1/01***
**U.S. Cl. 318—606** **15 Claims**



1. An apparatus for controllably moving a load in a return mode back to a first position after being controllably moved toward a second position from the first position in a forward mode by a motor controlled by a forward control circuit to track a moving object field, the load having a displacement resulting from moving from the first position toward the second position, said apparatus comprising:

sensing means for sensing the displacement of the load by generating a feedback signal at predetermined intervals along said displacement in both of said forward and return modes;

detecting means for detecting the passage of said moving object field to provide a return signal after the object field has passed a predetermined position;

driving means for controllably moving the load back towards the first position in the return mode in response to said return signal, said driving means including the motor for supplying said moving force, the motor moving the load to the second position in the return mode after responding to said return signal to define an overshoot displacement; and

return home circuit means repsonsive to the difference in the number of feedback signals in the forward mode and the current number of feedback signals in the return mode for providing an energizing bias signal to said driving means to cause said driving means to move the load back to the first position.

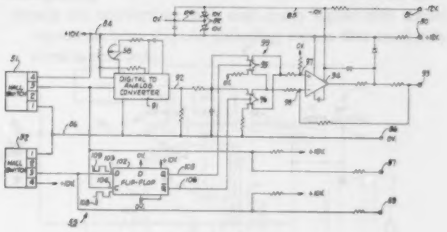


**4,110,676**

## DYNAMOELECTRIC MACHINE AND TACHOMETER

**John D. Edick, Wickliffe, and Kenneth A. Ostrander, Columbus, both of Ohio, assignors to Reliance Electric Company, Cleveland, Ohio**

**Filed Aug. 30, 1976, Ser. No. 718,798**
**Int. Cl.² G01P *3/42;* H02K *21/12, 16/00***
**U.S. Cl. 322—31** **13 Claims**



1. A combined dynamoelectric machine and tachometer enclosed within a single frame, comprising in combination,

an end bracket forming a part of said frame and surrounding a rotatable shaft of the machine,

wall means defining recess means in said end bracket,

a tachometer rotor mounted within said recess means and connected to be rotated in accordance with rotation of said shaft of the machine,

said tachometer rotor having a plurality of magnetic poles,

magnetically responsive first and second transducer means having an electrical output,

means mounting both said transducer means in said recess means close to said magnetic poles of said rotor to be magnetically actuated by rotation of said tachometer rotor,

means including said rotor and both said transducer means to sense direction as well as rotational speed of said tachometer rotor,

said second transducer means being mounted in a position spaced from said first transducer means by a distance $p(n + \frac{1}{2})$, where $n$ is any integer and $p$ is the pole pitch between adjacent north and south poles,

said direction sensing means including a D flip-flop,

one transducer means being connected to the clock input of said flip-flop and the other transducer means being connected to the data input of said flip-flop,

and amplifier means connected to the Q and Q outputs of said flip-flop to establish a negative or a positive output from said amplifier in accordance with first and second directions of rotation of the machine, respectively.

3. A tachometer stator for use with a tachometer rotor having a given radius and having magnetic poles, said stator comprising, in combination,

a base,

a transducer having an operating surface and mounted on said base,

speed signal processing circuitry mounted on said base and having an input connected to said transducer,

terminal means on said base for a speed signal output from said processing circuitry and for power supply input to said processing circuitry,

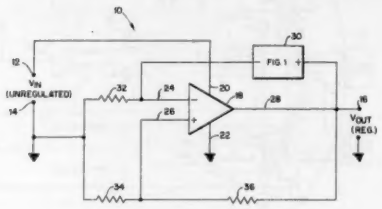
a calibration device on said base connected to calibrate said speed signal output,

and an externally accessible adjustment on said calibration device.

## 4,110,677
## OPERATIONAL AMPLIFIER WITH POSITIVE AND NEGATIVE FEEDBACK PATHS FOR SUPPLYING CONSTANT CURRENT TO A BANDGAP VOLTAGE REFERENCE CIRCUIT

**Attila D. Boronkay, Santa Ana, and Charles G. Axen, Irvine, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.**

**Continuation of Ser. No. 772,371, Feb. 25, 1977, abandoned. This application Oct. 12, 1977, Ser. No. 841,411**
**Int. Cl.² G05F *1/58***
**U.S. Cl. 323—19** **2 Claims**



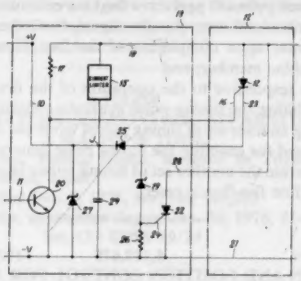

2. A voltage regulating circuit comprising:
an operational amplifier having an inverting input terminal, a noninverting input terminal, an output terminal, and a pair of supply voltage receiving terminals;
means for connecting said supply voltage receiving terminals to a source of unregulated supply voltage;
a two terminal, essentially zero temperature coefficient, bandgap voltage reference circuit;
means for connecting said voltage reference circuit in a negative feedback path between said output terminal and said inverting input terminal;
a voltage divider network having first and second resistive sections;
means for connecting said network between said output terminal and one of said supply voltage receiving terminals for establishing a voltage thereacross;
means connecting a junction of said resistive sections to said noninverting input terminal for establishing a positive feedback path between said output terminal and said noninverting input terminal, the relative resistance values of said resistive sections establishing a regulated output voltage level at said output terminal; and
resistance means connected between said one supply voltage terminal and a junction of said voltage reference circuit and said inverting input terminal for establishing a constant current flow in said negative feedback path through said voltage reference circuit.

## 4,110,678
## ELECTRONIC MONITORING SYSTEM

**Robert Buck, Kirchbühlweg 128, 7995 Neukirch, Fed. Rep. of Germany**

**Filed Mar. 29, 1977, Ser. No. 782,400**
**Claims priority, application Fed. Rep. of Germany, Mar. 30, 1976, 2613423**
**Int. Cl.² G05F *1/56*; H01H *36/00***
**U.S. Cl. 323—22 SC** **7 Claims**

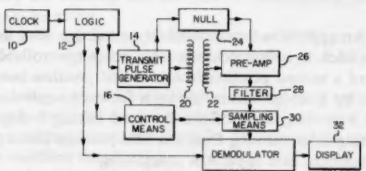
1. An electronic monitoring system comprising:
detector means sensitive to an ambient condition for generating an output signal varying with a change in said condition, said detector means being provided with a pair of power-input terminals;
a supply network including a storage capacitor connected across said power-input terminals, a pair of leads connected across a source of direct current in series with a load, and a current-limiting device connected across said leads in series with said storage capacitor;
a first binary electronic three-electrode switch having a pair of main electrodes respectively connected directly to said leads and further having an input electrode; and
an operating circuit for said first binary switch inserted between one main electrode and said input electrode thereof, said operating circuit including a second binary electronic three-electrode switch with input circuitry connected to said detector means for changing the conductivity of said first binary switch in response to variations in said output signal, thereby modifying the energization of said load, said operating circuit further including a Zener diode inserted in series with said second binary switch between one of said main electrodes and said input electrode of said first binary switch, said Zener diode becoming conductive upon a triggering of said second binary switch by said detector means to fire said first binary switch.



## 4,110,679
## FERROUS/NON-FERROUS METAL DETECTOR USING SAMPLING

**George C. Payne, Tempe, Ariz., assignor to White's Electronics, Inc., Sweet Home, Oreg.**

**Continuation-in-part of Ser. No. 526,678, Nov. 25, 1974, Pat. No. 4,030,026. This application Jun. 9, 1977, Ser. No. 805,025**
**Int. Cl.² G01V *3/10***
**U.S. Cl. 324—3** **15 Claims**




1. A metal detector for detecting and distinguishing between ferrous and non-ferrous metal objects in an area which may contain ferrous mineralized soil comprising:
transmit coil means;
receive coil means electromagnetically coupled to said transmit coil means by said area such that a current central flowing in said transmit coil means causes a corresponding voltage to be induced in said receive coil means;
transmit pulse generator means electrically connected to said transmit coil means for generating transmit current pulses and applying said current pulses to said transmit coil means, said transmit pulses being provided as groups of pulses, each group including a pulse of a first polarity followed by at least two pulses of a second and opposite polarity;
sampling means electrically connected to the output of said receive coil means, for sampling two receive voltage pulses corresponding to the voltage pulses induced in said

receive coil means by the application of said two current pulses to said transmit coil means;

control means electrically connected to said sampling means for adjusting the time of sampling of each of the two receive voltage pulses such that when no metal objects are present in said area, the two sampled voltage levels of said two voltage pulses are substantially equal; and

output means electrically connected to the output of said sampling means for determining from the two sampled voltage levels of said two receive signals when a ferrous metal object is present in said area and indicating the presence of such ferrous metal object.

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## 4,110,680
## METHOD AND APPARATUS FOR MEASURING THE QUANTITY OF A FLUID FLOWING THROUGH A PIPE BY MEANS OF NUCLEAR MAGNETIC SPIN RESONANCE

**Wilfried Bergmann, Erlangen, and Berthold Knüttel, Rheinstetten-Mörsch, both of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim, Germany**

**Filed Jan. 9, 1976, Ser. No. 647,703**

**Claims priority, application Fed. Rep. of Germany, Jan. 17, 1975, 2501794**

**Int. Cl.[2] G01R *33/08***

**U.S. Cl. 324—0.5 B** **11 Claims**

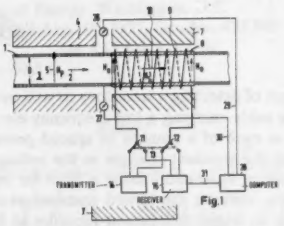


Fig.1

1. A method of measuring the quantity of a flowing fluid through the use of nuclear magnetic spin resonance which comprises passing a fluid containing magnetizable nuclei and having portions of different flow velocities through a pipe of at least partially non-magnetic electrically insulating material; applying a direct-current magnetic field to the fluid at one given location of the pipe to align the nuclei spin axes thereof; applying an alternating-current magnetic field to the fluid at the one given location of the pipe to synchronize the nuclei; and determining the course in time of the nuclear magnetization at the one given location of the pipe, correlating the differential of the course in time to the flow velocity of isochronous flow groups which, together, fill the entire flow cross section of the pipe at the beginning of the determined course in time, the sum of the products of the flow velocity and the corresponding instantaneous values of the course in time of the nuclear magnetization providing a measure for the mass flow density of the fluid.

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## 4,110,681
## NMR FIELD FREQUENCY LOCK SYSTEM

**Donald C. Hofer; Vincent N. Kahwaty, both of Poughkeepsie, and Carl R. Valentino, Hopewell Junction, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Feb. 16, 1977, Ser. No. 769,142**

**Int. Cl.[2] G01R *33/08***

**U.S. Cl. 324—0.5 A** **9 Claims**

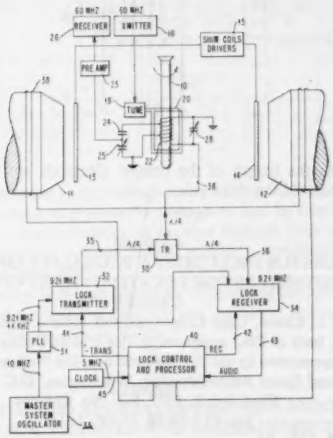
1. In an NMR spectrometer comprising a permanent magnet providing a magnetic field for polarizing a control sample and a test sample, and a field coil for varying the intensity of the magnetic field, the combination comprising:

means for periodically applying a pulse modulated RF magnetic field to excite said control sample at a resonant frequency, said pulse modulated RF magnetic field having a frequency offset from said resonant frequency of said control sample to periodically produce free induction decay signals each having a period of oscillation;

means for detecting said free induction decay signals;

means for measuring said period of each of said decay signals comprising

means for converting each said decay signal into digital representations thereof including values that cyclically cross a zero axis,




digital means for detecting when said values have crossed said zero axis a predetermined number of times,

and digital timing means operable concurrently with operation of said last mentioned detecting means for providing digital indications of the amount of time it takes to cross said zero axis said predetermined number of times, said indications being proportional to the length of said periods;

and means responsive to said indications for varying said current in said field coil, when each said indication differs from a predetermined value, so as to tend to maintain said periods at a predetermined constant value.

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## 4,110,682
## WELL LOGGING APPARATUS WITH PAD-MOUNTED ARRAY OF VERTICAL ELECTRODES OF DIFFERENT LENGTHS FOR MEASURING THE RESISTIVITY OF THE FLUSHED ZONE

**Jacques Rene Tabanou, Chevreuse, France, assignor to Schlumberger Technology Corporation, New York, N.Y.**

**Filed Jun. 10, 1977, Ser. No. 805,240**

**Int. Cl.[2] G01V *3/18, 3/06***

**U.S. Cl. 324—10** **3 Claims**

1. An electrode-carrying pad member suitable for engaging the wall of a borehole to investigate the adjacent formations, comprising an array of linear electrodes substantially parallel to each other, with a central electrode and first, second and third pairs of electrodes respectively short-circuited and symmetrically located with respect to the central electrode at respecting increasing distances from the central electrode, the central electrode being substantially shorter than the elec-

trodes of the third pair, and the electrodes of the first and second pairs having substantially the same length comprised

between the length of the central electrode and that of the electrodes of the third pair.

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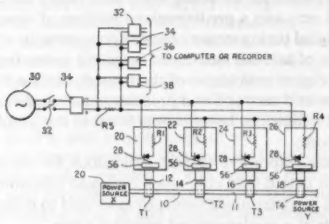
**4,110,683**

## APPARATUS INCLUDING A PLURALITY OF SPACED TRANSFORMERS FOR LOCATING SHORT CIRCUITS IN CABLES

**Robert L. Cason, Cape Canaveral, and John J. McStay, Titusville, both of Fla., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Jul. 8, 1977, Ser. No. 814,004**
**Int. Cl.[2] G01R *31/08, 19/16***
**U.S. Cl. 324—52** **4 Claims**




1. An apparatus for monitoring faults such as grounding in an electrical power cable which produce an abnormally high current in that portion of said cable extending between a power supply connected to one end of said cable and the point where said cable is grounded, said apparatus comprising:

(a) a power supply,

(b) a resistive element connected to said power supply,

(c) a plurality of current transformers spaced at predetermined points along said cable and coupled thereto for sensing current flowing through said cable,

(d) trigger circuit means connected to each of said current transformers for increasing the voltage drop across said resistive element a predetermined amount responsive to an abnormally high current flowing through the current transformer that it is connected to,

(e) said trigger circuit means including,

(i) a resistor, and

(ii) means for placing said resistor in series with said resistive element responsive to an abnormally high current flowing through the respective transformer to which the respective trigger circuit is connected, and

(f) means for measuring the voltage drop across said resistive element for determining the number of current transformers said abnormally high current flows through,

whereby the location of said grounded point of said cable can be determined from the magnitude of said voltage drop across said resistive element.

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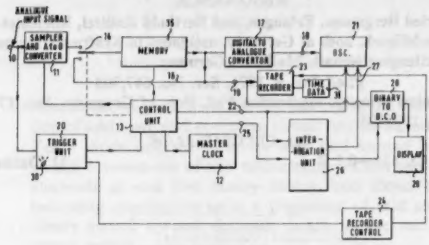
**4,110,684**

## METHOD OF DETECTING FAULTS ON LOW VOLTAGE DISTRIBUTION ELECTRIC CABLES UTILIZING A PLURALITY OF TRANSIENT RECORDERS

**Philip Franklin Gale, Mold, Wales, assignor to The Electricity Council, England**

**Filed Mar. 21, 1977, Ser. No. 779,435**
**Claims priority, application United Kingdom, Mar. 22, 1976, 11484/76**
**Int. Cl.[2] G01R *31/08, 19/16***
**U.S. Cl. 324—52** **3 Claims**




1. A method of detecting a transitory or non-persistent fault in an electric cable carrying a low frequency electric current comprising, at each of a number of spaced points along the cable, sensing the transient changes in the voltage waveform between a pair of conductors using a filter for rejecting said low frequency, utilising the sensed transient at each of said second points to trigger a transient recorder at that point to record the voltage on said cable over a predetermined period having a duration of a few cycles at said low frequency both immediately before and immediately after the sensing of said transient changes, each of the recorders including an analogue-to-digital converter and having means for holding the digital output, and simultaneously recording time reference data in each recorder whereby the information recorded by the separate recorders is correlatable, and subsequently interrogating the recorded data to determine the amplitudes of the waveforms at corresponding time instants at the various spaced points, and determining the location of the fault on the cable from the voltage gradient.

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**4,110,685**

## STANDING WAVE RATIO MEASUREMENT INSTRUMENT

**Virgil G. Leenerts, 1007 W. 30th St., Loveland, Colo. 80537**

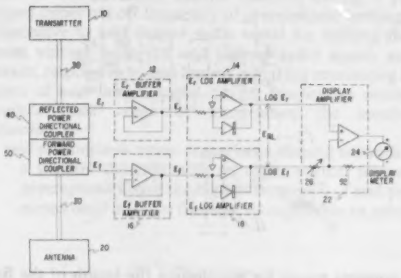
**Filed Nov. 1, 1976, Ser. No. 738,163**
**Int. Cl.[2] G01R *27/04***
**U.S. Cl. 324—58 B** **8 Claims**

1. In a radio frequency power transmission system in which radio frequency power is transferred from a source to a load via a transmission line, the combination comprising:

directional coupler means connected along the transmission line for producing a first voltage indicative of the forward power conveyed by the transmission line and for producing a second voltage indicative of the reflected power conveyed by the transmission line;

logarithmic amplifier means for receiving the first and second voltages and for producing a third voltage that is proportional to the difference between the logarithm of

the first voltage and the logarithm of the second voltage; and




analog display means connected to the logarithmic amplifier means for receiving the third voltage and for providing a visual indication of return loss to the user.

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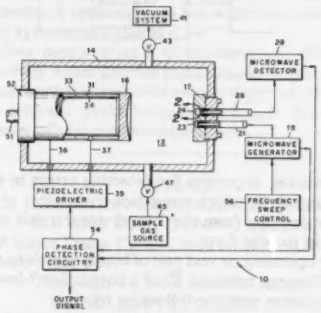
**4,110,686**

## PIEZOELECTRIC-TUNED MICROWAVE CAVITY FOR ABSORPTION SPECTROMETRY

**Branko Leskovar, Moraga, Calif.; Harold T. Buscher, Orlando, Fla., and William F. Kolbe, Berkeley, Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Aug. 17, 1977, Ser. No. 825,503**
**Int. Cl.[2] G01R *27/04***
**U.S. Cl. 324—58.5 C** **9 Claims**




1. A tuning device including a microwave cavity for continuously and rapidly tuning the cavity over a wide range of frequencies in synchronism with frequency modulations of microwave energy applied to the cavity, for detecting the presence of a particular gas in a gas sample in the cavity by absorption of microwave energy by the particular gas at its absorption frequency, said tuning device including:

first and second opposing walls defining the cavity; and

a piezoelectric transducer for moving said first wall with respect to said second wall to maintain the cavity in continuous resonance with the applied microwave energy during frequency modulation of the microwave energy.

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**4,110,687**

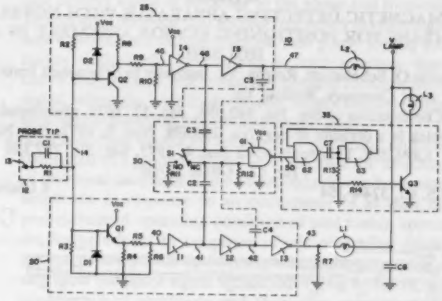
## DUAL THRESHOLD LOGIC PROBE

**James W. Sneed, Jr, c/o Kurz-Kasch, Inc., 1501 Webster St., P. O. Box 1246, Dayton, Ohio 45401**

**Filed Aug. 24, 1977, Ser. No. 827,301**
**Int. Cl.[2] G01R *19/16, 31/02***
**U.S. Cl. 324—133** **6 Claims**

1. In a logic probe having circuit means for energizing a first lamp to indicate a logic high condition when the voltage applied to an input tip of the probe is above a first predetermined level, for energizing a second lamp to indicate a logic low condition when the voltage on the probe is below a second predetermined level, and for energizing a third lamp to indicate a pulse or transition of voltage from one logic condition to another,

wherein the improvement comprises




means responsive to the voltage on said input tip for providing an output only when the voltage on said tip transitions from one logic condition to another through both of said predetermined voltage levels within a predetermined period of time, and

means responsive to said output for controlling the operation of said third lamp to indicate said transition across both predetermined voltage levels.

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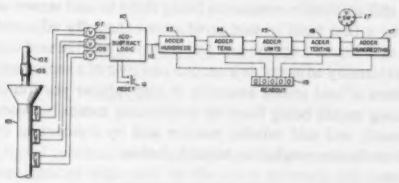
**4,110,688**

## METHOD AND APPARATUS FOR PIPE JOINT LOCATOR, COUNTER AND DISPLACEMENT CALCULATOR

**John M. Bailey, Houston, Tex., assignor to Monitoring Systems, Inc., Thibodaux, La.**

**Filed Sep. 20, 1976, Ser. No. 724,729**
**Int. Cl.[2] G01R *33/12***
**U.S. Cl. 324—208** **11 Claims**




1. Apparatus for counting pipe joints passing through a drill hole bell nipple going either downhole or uphole comprising in combination:

a. a plurality of sensor means for sensing at spaced apart positions along and externally of said bell nipple the passage of pipe joints downhole and uphole past said sensor means,

b. logical means for logically determining the direction of pipe joint travel in circuit with and triggered by signals from said sensor means spaced along said bell nipple to develop plus signal counts for downhole going joints and minus signal counts for uphole going joints,

c. joint counter means in circuit with said logical means for adding a plus signal each time a joint is sensed going downhole, and

d. means in circuit with said logical means for subtracting a count from said joint counter means each time a joint is

sensed coming uphole in response to said minus signal count, and

e. stand counter means in circuit with said logical means for converting the joint count to a stand count using said plus and minus signal counts.

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**4,110,689**

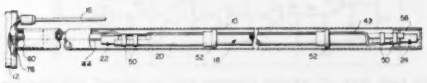
## MAGNETIC DETECTING APPARATUS WITH NOVEL MEANS FOR POSITIONING SENSOR ASSEMBLY IN A HOUSING

**Erick O. Schonstedt, Reston, Va., assignor to Schonstedt Instrument Company, Reston, Va.**

**Continuation of Ser. No. 542,084, Jan. 17, 1975, abandoned, which is a division of Ser. No. 303,598, Nov. 3, 1972, Pat. No. 3,894,283. This application Jan. 4, 1977, Ser. No. 757,124**

**Int. Cl.[2] G01R *33/04***

**U.S. Cl. 324—254** **4 Claims**



1. Magnetic detecting apparatus comprising housing means having a first portion containing a circuit chassis fixed therein and having an elongated tubular portion extending from said first portion, a sensor assembly in said tubular portion and including an elongated tubular support extending along said tubular portion and first and second magnetic sensor units, each sensor unit including a tubular housing with first and second end discs and a hollow magnetic core extending between the first and second end discs of the sensor unit, said elongated tubular support having a notch extending longitudinally at each end of the support and open laterally of the support, each sensor unit being fitted into a corresponding notch with its tubular housing and its core extending longitudinally of the support and being fixed to the support, and a stiff excitation conductor extending from said first portion of said housing means successively through the first end disc, the core, and the second end disc of the first sensor unit and the first end disc, the core, and the second end disc of the second sensor unit, and then back to said first portion of said housing means, said stiff excitation conductor being fixed to said sensor assembly by a first bend in said conductor externally adjacent to a first end disc of a sensor unit and a second bend in said conductor externally adjacent to a second end disc of a sensor unit, the position of said sensor assembly in said tubular portion of said housing means being fixed by positioning means between said assembly and said tubular portion and by connection of said stiff excitation conductor to said chassis.

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**4,110,690**

## CHANNEL SELECTING DEVICE

**Takao Kakigi, Inagi, Japan, assignor to Cybernet Electronic Corporation, Kanagawa, Japan**

**Filed Jan. 7, 1977, Ser. No. 757,671**

**Claims priority, application Japan, Jan. 16, 1976, 51/4127; Feb. 4, 1976, 51/12348; Feb. 14, 1976, 51/16535**

**Int. Cl.[2] H04B *1/40***

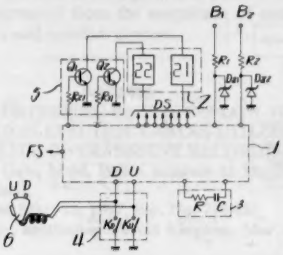
**U.S. Cl. 325—25** **3 Claims**

1. In a transceiver for transmission and reception over a radio channel, a channel selecting device comprising:

display means for indicating a selected channel number;

actuatable logic means for shifting the channel number at a variable rate during a first time interval and at a fixed rate thereafter and generating instruction signals to control the display means;

channel selection means for actuating the logic means and controlling the shifting rate during the first time interval; and



time constant means for establishing the length of the first time interval.

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**4,110,691**

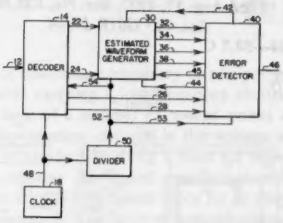
## APPARATUS AND METHOD FOR DETECTING ERRORS IN A 7-LEVEL CORRELATIVE SIGNAL

**Adam Lender, Palo Alto, Calif., assignor to GTE Automatic Electric Laboratories, Incorporated, Northlake, Ill.**

**Filed Mar. 14, 1977, Ser. No. 777,485**

**Int. Cl.[2] H04L *1/10***

**U.S. Cl. 325—41** **8 Claims**




1. At a receiver, apparatus for detecting errors in a 7-level correlative signal, C, which comprises:

means for deriving from the 7-level signal a pair of binary signals in parallel form;

means for operating on said pair of binary signals to derive in binary form an estimate, $\hat{C}$, of a correlative 7-level signal in accordance with the following relation:

$$\hat{C} = \hat{B} - \Delta^2 \hat{B} \text{ (algebraic)}$$

where $\hat{B}$ represents the present digits in binary form;

$\Delta^2 \hat{B}$ represents the past digits in binary form; and

$\Delta$ represents a delay of 2 T seconds and 1/T is the digit rate in digits/second;

means for determining if the top and bottom levels of C and $\hat{C}$ occur at the same time; and

means for providing an error output signal when $C \neq \hat{C}$ during the occurence of a top or bottom level of C.

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**4,110,692**

## AUDIO SIGNAL PROCESSOR

**Bortolo Mario Pradal, Pittsburgh, Pa., assignor to RCA Corporation, New York, N.Y.**

**Filed Nov. 12, 1976, Ser. No. 741,404**

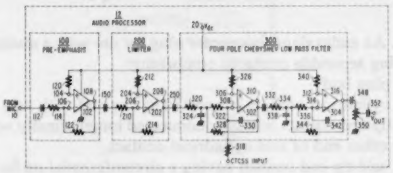
**Int. Cl.[2] H04B *1/66***

**U.S. Cl. 325—147** **6 Claims**

1. In an audio processor for use in a direct frequency modulation system responsive to an input signal having components at a plurality of frequencies within a predetermined band of audio frequencies, said audio processor being of the type in-

cluding preemphasis means, responsive to said input signal, for shaping the magnitude of preselected ones of said input signal frequency components in accordance with a predetermined transfer function, said transfer function having a predetermined upper cut off frequency of preemphasis; limiting means, responsive to said shaped audio signal for limiting the maximum voltage swing of said shaped audio signal; and filter means, responsive to said limited signal for attenuating components of said limited signal having frequencies outside of a predetermined range of frequencies; the improvement wherein;

said preemphasis means comprises a shaping network having a transfer function with an upper cut off frequency of preemphasis above the highest frequency of said predetermined band of audio frequencies to provide an attenuation



characteristic that decreases substantially at a constant logarithmic rate with increasing frequency across said predetermined audio frequency band,

said limiting means including a Norton type of operational amplifier characterized by inventing and non-inverting current responsive inputs biased by a single source using the current mirror type operation and by the collector load of a difference current amplifier being a constant current source, said operational amplifier having a value of feedback resistance and bias resistance selected to provide symmetrical clipping,

said filter means being a Chebychev type filter having a generally equal amplitude but ripple response over said predetermined band with a steep slope cut off with one of the response peaks being located near the highest frequency of said predetermined band.

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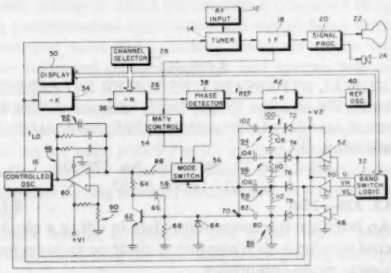
**4,110,693**

## LOCKUP INHIBITING ARRANGEMENT FOR A PHASE LOCKED LOOP TUNING SYSTEM

**Wayne Wheeler Evans, Carmel, Ind., assignor to RCA Corporation, New York, N.Y.**

**Filed Jan. 24, 1977, Ser. No. 762,107**
**Int. Cl.[2] H04N 5/50; H04B 1/26**
**U.S. Cl. 325—419** **16 Claims**



1. Apparatus for tuning a receiver to various tuning positions comprising:

controlled oscillator means for generating a local oscillator signal having its frequency controlled in response to a control signal, said local oscillator signal having an amplitude also controlled in response to said control signal;

first divider means for dividing the frequency of said local oscillator signal to generate a first frequency divided local oscillator signal, said first divider means being susceptible to oscillating and thereby generating a spurious signal;

phase locked loop means including second divider means for dividing the frequency of said first frequency divided local oscillator signal by a factor determined by a selected one of said tuning positions to generate a second frequency divided local oscillator signal and for generating said control signal in response to the phase and frequency relationship between said second frequency divided signal and a reference frequency signal, said phase locked loop means undesirably responding to said spurious signal rather than to said first frequency divided local oscillator signal when the amplitude of said local oscillator signal falls below a predetermined amplitude; and

lockup inhibiting means for temporarily presetting said control signal to a predetermined level to cause the amplitude of said local oscillator signal to exceed said predetermined amplitude in response to an occurrence of at least one predetermined operating condition of said tuning apparatus during which the operation of said controlled oscillator means is initiated and during which the amplitude of said local oscillator signal would otherwise be below said predetermined amplitude and thereafter permitting said control signal to be normally controlled by said phase locked loop means.

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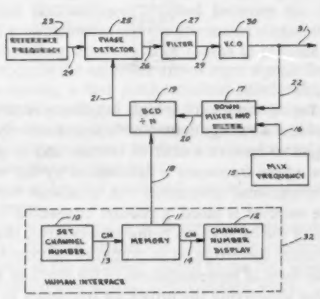
**4,110,694**

## CHANNEL NUMBER INTERFACE

**Gary L. Wilhelm, Waseca, Minn., assignor to Warren A. Sturm, Minneapolis, Minn.**

**Filed Oct. 10, 1975, Ser. No. 621,364**
**Int. Cl.[2] H04B 1/06; H03B 3/04**
**U.S. Cl. 325—464** **3 Claims**



1. Digital synthesizer for providing a frequency reference in communications apparatus of the class wherein the nominal frequency of operation is expressed in terms of numbers for the synthesized frequencies of operation comprising:

a. a source of reference frequency;

b. phase detecting means connected to said source of reference frequency;

c. means including a filter and a voltage controlled oscillator connecting an output of said phase detecting means to an output terminal;

d. a down mixer and filter means connected to said output terminal;

e. a mix frequency source means connected to said down mixer;

f. a binary coded decimal divide by N divider means connected between said down mixer and filter means and said phase detecting means;

g. a memory means connected to said BCD divide by N divider means, and;

h. a source of number input means connected to an input of said BCD divide by N means whereby such particular

numbered input of said numbered input means corresponds to a particular channel related frequency number, and the down mixer and filter means in addition to said source of mix frequency permits the choice of N for said BCD divide by N divider means so that the lower order bits of said BCD divide by N divider means are equal to said channel numbers.

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**4,110,695**

## TUNING CIRCUIT FOR HIGH FREQUENCY RECEIVERS

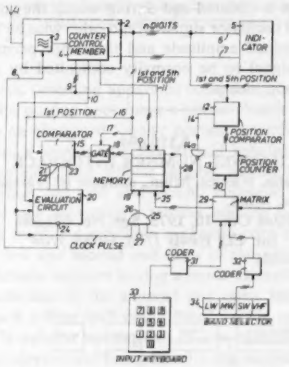
**Otto Klank, Arpke; Dieter Rottmann, Hanover, and Stephan Wuttke, Laatzen, all of Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Fed. Rep. of Germany**

**Filed Jul. 26, 1976, Ser. No. 708,754**

**Claims priority, application Fed. Rep. of Germany, Jul. 24, 1975, 2533072**

**Int. Cl.[2] H04B 1/16**

**U.S. Cl. 325—464** **38 Claims**




1. In a tuning circuit for a high frequency receiver, which circuit includes a voltage controllable superheterodyne oscillator arranged to receive a control voltage and to produce an oscillation whose frequency is determined by the value of the control voltage and determines the broadcast frequency to which the receiver is tuned, a counter connected to sense the frequency of the oscillations being generated by the oscillator and to produce therefrom, at an output of the counter, a count state in the form of representations of the digits of a first decimal number identifying the broadcast frequency to which the receiver is currently tuned, input means for generating representations of the digits of a second decimal number identifying the broadcast frequency to which it is desired to tune the receiver, the input means having an output at which the representations of the second decimal number digits appear, and a comparison circuit for comparing the decimal number representations being produced by the counter and the input means to vary the control voltage in a direction to cause the number representation produced by the counter to coincide with the number representation generated by the input means, the improvement wherein said comparison circuit comprises: a single comparator having first and second inputs and capable of comparing, at one time, only the representations of one digit of each of two numbers; and time multiplex means interconnecting the output of said counter, the output of said input means and said comparator inputs, for delivering to said first comparator input, in succession, each digit representation produced by said counter, starting with the most significant digit, and for delivering, simultaneously therewith to said second comparator input, each digit representation of corresponding significance generated by said input means.

**4,110,696**

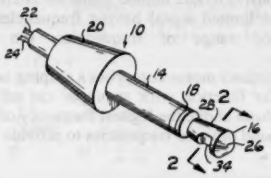
## AUDIO ECCENTRIC CONNECTOR PLUG

**Emett O. Meeks, P.O. Box 10493 Oklahoma City, Okla. 73110**

**Filed Jan. 10, 1977, Ser. No. 758,362**

**Int. Cl.[2] H04B 1/10; H01R 13/20, 13/54**

**U.S. Cl. 325—480** **5 Claims**




1. An audio signal connector plug for use with a mating jack having separable contacts, comprising:

a plug body;

a cylindrical contact connected at one end with said body;

a tip end contact coaxially connected longitudinally with the other end of said cylindrical contact,

said tip end contact having a circumferential surface converging toward the longitudinal axis of said cylindrical contact,

said tip end contact having a longitudinal and transverse recess formed in its converging surface, the depth of the recess being no greater than the radius of the tip end contact whereby when said plug is inserted into said mating jack, said cylindrical contact and said tip end contact engage said jack contacts without separating the latter by the recess nesting one of said jack contacts when said plug body is in one angular position and separates said separable jack contacts when rotated to another angular position;

electrical insulating means separating said contacts;

a pair of conductors extending through said body and connected with the contacts and,

an audio signal filter connected with said conductors opposite said contacts.

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**4,110,697**

## DIGITAL BYPASSABLE REGISTER INTERFACE

**Dwight R. Wilcox, San Deigo, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Feb. 22, 1977, Ser. No. 770,333**

**Int. Cl.[2] H03K 17/02**

**U.S. Cl. 328—154** **9 Claims**

1. An interface for transmitting data in either a clock edge triggered synchronous transmission mode or an asynchronous tranmission mode comprising:

input means for receiving a series of digital data;

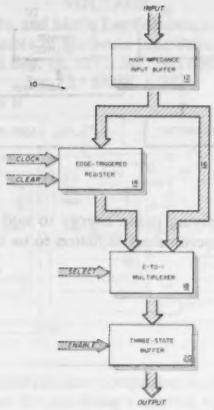
an edge triggered register connected to said input means and including an input for receiving clock pulses;

conducting means connected to said input means for providing a bypass path around said edge triggered register;

output means for outputting digital pulses;

a two-to-one multiplexer means having inputs connected to

said edge triggered register and to said conducting means for selectively connecting the output of either said edge




triggered register or said conducting means to said output means.

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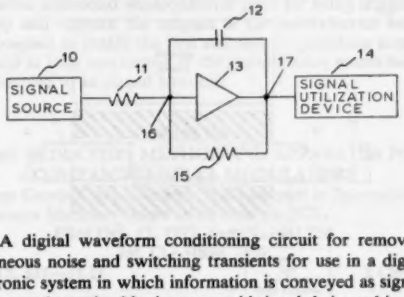
**4,110,698**

## DIGITAL WAVEFORM CONDITIONING CIRCUIT

**Adelore F. Petrie, 7 W. Lillian, Arlington Heights, Ill. 60004**

**Filed Jan. 21, 1977, Ser. No. 761,470**
**Int. Cl.² H03K *5/01***
**U.S. Cl. 328—164** **4 Claims**




1. A digital waveform conditioning circuit for removing extraneous noise and switching transients for use in a digital electronic system in which information is conveyed as signals having predetermined logic states, said signals being subjected to extraneous noise and switching transients which tend to produce undesired reactions within said system, said circuit comprising:

signal buffer amplifier means having a gain of more than one, responsive to applied signals, producing output signals having the same polarity as the applied signals, said signal buffer amplifier means including a noninverting buffer amplifier having an input terminal and an output terminal; and

feedback means, coupled to said signal buffer amplifier means, combining the functions of integrating said applied signals and adding a portion of said output signal to said applied signals, said feedback means including a capacitor coupled between said input and output terminals, said feedback means including a series resistor coupling said input terminal to said information system;

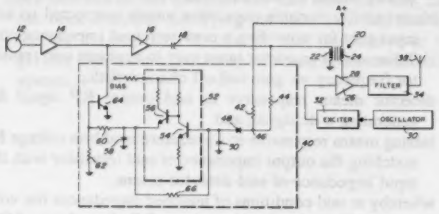
whereby said amplifier means is operating in the switching mode with said feedback means ensuring abrupt changes between logic states in said output signals.

**4,110,699**

## ADAPTIVE AUDIO COMPRESSOR

**Charles William Bethards, Schaumburg, Ill., assignor to Motorola Inc., Schaumburg, Ill.**

**Filed Mar. 25, 1976, Ser. No. 670,505**
**Int. Cl.² H03B *3/02*; H03K *1/14***
**U.S. Cl. 328—168** **7 Claims**




1. A signal processing means, responsive to a DC voltage, for processing AC signals comprising:

an amplifier means having an input, for receiving the AC signals, and an output, the amplifier producing amplified input signals at its output;

attenuator means for controlling the level of AC signals at the amplifier input responsive to a control signal;

a first sensing means for sensing the DC voltage and developing a signal representative thereof;

a second sensing means for sensing the level of the AC signal produced at the amplifier output and developing a signal representative thereof;

a control signal means for sensing the signals developed by the first and second means and producing a predetermined control signal in response thereto, said control signal means including an amplifier, having a predetermined reference bias voltage, coupled between the first and second sensing means and the attenuator means, the amplifier controlling the attenuator means to provide minimal attenuation of the amplifier means input signals for control signals having a first predetermined relationship to said reference bias voltage, the amplifier increasing the attenuation of the amplifier means input signals for control signals having a second predetermined relationship to said reference bias voltage; and

means for coupling the produced control signal to the attenuator means,

said control signal causing predetermined attenuation of the input AC signal such that the ratio of the amplitude of the AC signal at the amplifier output to the DC voltage level is maintained at a substantially constant level.

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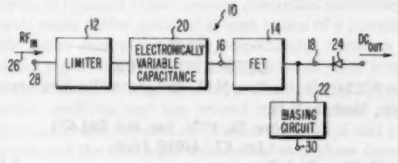
**4,110,700**

## ELECTRONICALLY TUNABLE MICROWAVE FREQUENCY FET DISCRIMINATOR

**Arye Rosen, Cherry Hill, and Edward Mykietyn, West Windsor, both of N.J., assignors to RCA Corporation, New York, N.Y.**

**Filed Oct. 25, 1977, Ser. No. 845,211**
**Int. Cl.² H03D *3/26***
**U.S. Cl. 329—103** **14 Claims**




1. A microwave frequency discriminator comprising:

a transistor amplifier including a field effect transistor having first, second and third electrodes, said transistor amplifier having an output port, and an input port for receiving an input RF signal of substantially constant power level, said transistor being biased an amount for generating in response to said input RF signal an output RF signal having a predetermined frequency vs. gain roll-off characteristic within a predetermined frequency bandwidth;

electronically variable capacitive means connected to said input port for providing a predetermined impedance condition at said transistor input port to augment said transistor frequency vs. gain roll-off characteristic;

detector means responsive to said output RF signal for generating a dc signal; and

biasing means responsive to a predetermined bias voltage for matching the output impedance of said transistor with the input impedance of said detector means,

whereby at said conditions of matched impedances the voltage of said dc signal varies substantially linearly as a function of the frequency of said input RF signal.

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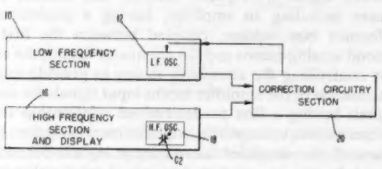
**4,110,701**

## METHOD AND APPARATUS FOR NEAR-SYNCHRONIZATION OF A PAIR OF OSCILLATORS, AND MEASURING THEREBY

**Albert H. Medwin, Princeton, N.J., assignor to CGS Systems, Inc., Princeton, N.J.**

**Filed Mar. 14, 1977, Ser. No. 776,841**
**Int. Cl.[2] G01R *27/26;* H03B *3/04***
**U.S. Cl. 331—1 A** **27 Claims**




1. In combination, a low frequency oscillator, a high frequency oscillator gated by said low frequency oscillator for a selected portion of a period of said low frequency oscillator, one of said oscillators being correctible in increments, a plurality of electrical elements, a counter counting the oscillations of said high frequency oscillator during said selected gated portions, means, including means for selectively individually connecting or disconnecting said elements from said correctible oscillator, and responsive to the count in said counter during said portion in excess or in deficiency of a selected count for said selected gated portion to increase or decrease and thereby correct the frequency of the correctible oscillator by an increment, whereby the high frequency oscillator is brought into near synchronism after a number of such corrections with said low frequency oscillator to within a high frequency period during said portion of a low frequency period.

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**4,110,702**

## DEEP RED LASER

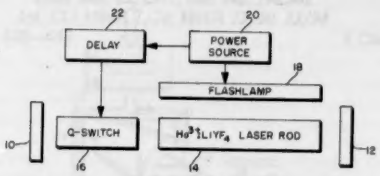
**Evan P. Chicklis, Nashua, N.H., assignor to Sanders Associates, Inc., Nashua, N.H.**

**Filed Nov. 24, 1976, Ser. No. 744,671**
**Int. Cl.[2] H01S *3/16***
**U.S. Cl. 331—94.5 F** **5 Claims**

1. An optically pumped solid state laser, comprising:

a laser cavity;

a laser medium which lases at 0.75 micrometers disposed in said cavity; and




means for supplying pump energy to said laser medium to cause 0.75 micrometers radiation to be emitted from said cavity.

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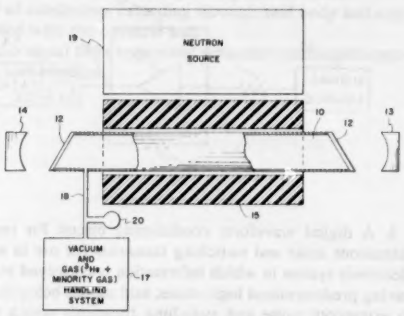
**4,110,703**

## VOLUMETRIC DIRECT NUCLEAR PUMPED LASER

**James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of; Nelson W. Jalufka, Yorktown; Frank Hohl, Newport News; Russell J. DeYoung, and Michael D. Williams, both of Hampton, all of Va.**

**Filed Apr. 19, 1977, Ser. No. 788,704**
**Int. Cl.[2] H01S *3/09***
**U.S. Cl. 331—94.5 P** **12 Claims**




1. A volumetric direct nuclear pumped laser comprising:

a gas laser cell located between two mirrors to form a resonant cavity, one of said two mirrors having a transmission greater than the other of said two mirrors and being the output mirror of said nuclear pumped laser;

a gas mixture consisting of $^3$He and a minority gas from the group of argon, krypton, xenon, chlorine and fluorine;

a gas-handling system for introducing said gas mixture into said laser cell and for maintaining the proper pressure of the gas mixture;

a neutron source for applying a neutron flux of sufficient density to the gas mixture in said laser cell to pump the gas mixture; and

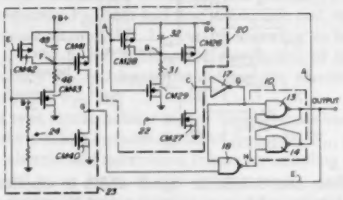
a moderator surrounding said laser cell for thermalizing the neutrons produced by the neutron source to take advantage of the large thermal neutron capture cross section of the $^3$He.

## 4,110,704

## ASTABLE MULTIVIBRATOR WITH TEMPERATURE COMPENSATION AND REQUIRING A SINGLE SUPPLY VOLTAGE

**James Stuart Irwin, and Merle Lee Gilmore, both of Ft. Lauderdale, Fla., assignors to Motorola Inc., Schaumburg, Ill.**

**Filed Sep. 19, 1977, Ser. No. 834,076**
**Int. Cl.[2] H03K 3/282**
**U.S. Cl. 331—113 R** **10 Claims**




1. An astable multivibrator comprising in combination:
first input means for providing a control signal;
first semiconductor means coupled for being controlled by the control signal;
second semiconductor means coupled in series with the first semiconductor means;
first switching means coupled to control the second semiconductor means;
supply means for supplying a reference signal;
third semiconductor means coupled for being controlled by the reference signal;
fourth semiconductor means coupled in series with the third semiconductor means;
second switching means coupled to control the fourth semiconductor means; and
multivibrator means coupled to receive the outputs of the series connected semiconductor pairs for being triggered by said outputs, the outputs of the multivibrator being coupled to enable the first and second switching means, and at least one output of the multivibrator means being coupled to an output terminal.

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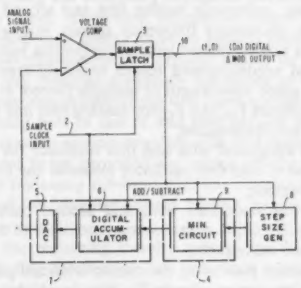
## 4,110,705

## NOISE REDUCTION METHOD AND APPARATUS FOR COMPANDED DELTA MODULATORS

**William George Crouse, Raleigh, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Oct. 17, 1977, Ser. No. 842,710**
**Int. Cl.[2] H03K 7/02**
**U.S. Cl. 332—11 D** **2 Claims**




1. In a delta modulation digital signal transmission system having a voltage step size generator operating under a simulation algorithm for controlling the generation of 1 and 0 bits in the transmission system for later demodulation and reconstruction of an analog waveform, the method of reducing random or low level noise production during low level or quiet passages of the analog input signal comprising steps of:
detecting the minimum step size calculation at the output of the step size generator;
comparing the presently modulated digital bit to be transmitted with the previously transmitted digital bit; and
when said bits do not compare and said minimum step size has been detected, modifying the calculated step size by forcing the step size for the bit next transmitted to be greater than the minimum step size used in the modulation system.

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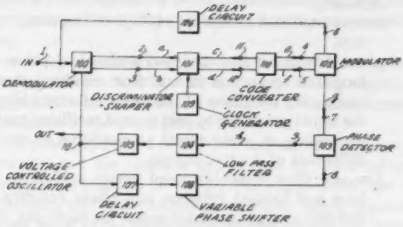
## 4,110,706

## PHASE SYNCHRONIZING CIRCUIT

**Youichi Matsumoto; Yoshimi Tagashira, and Seijiro Yokoyama, all of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan**

**Filed Oct. 6, 1976, Ser. No. 730,292**
**Claims priority, application Japan, Oct. 7, 1975, 50-120914**
**Int. Cl.[2] H03C 3/00**
**U.S. Cl. 332—19** **5 Claims**

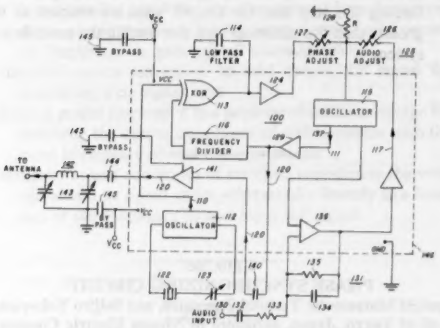



1. A phase synchronizing circuit for reproducing a synchronizing carrier wave from an N-phase ($N = 2^n$, $n$ being a positive integer) PSK modulated signal supplied thereto, comprising: a voltage controlled oscillator; an N-phase demodulator receiving said modulated signal and the output signal of said voltage controlled oscillator; an N-ary code converter coupled to the output of said demodulator; an N-phase modulator having a first input terminal coupled to the output of said N-ary code converter; a first delay circuit being provided between the modulated signal input terminal of said demodulator and a second input terminal of said modulator; a phase detector having a first input terminal supplied with the output of said modulator; a second delay circuit installed between the output terminal of said voltage controlled oscillator and a second input terminal of said phase detector; a low-pass filter installed between the output terminal of said phase detector and the input terminal of said voltage controlled oscillator; and a variable phase shifter installed at least in one of a plurality of possible paths said paths being respectively: between said modulated signal input terminal and the second input terminal of said modulator; between the output terminal of said voltage controlled oscillator and the second input terminal of said phase detector, and between the output terminal of said phase modulator and the first input terminal of said phase detector; wherein carrier wave phases in the said phase synchronizing circuit are made variable by changing the conversion states of said code converter.

## 4,110,707
## INDIRECT FM MODULATION SCHEME USING PHASE LOCKED LOOP

**William Henry Giolma, Garland, and Bernhard Hans Andresen, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Dec. 13, 1976, Ser. No. 750,059**
**Int. Cl.[2] H03C 3/10**
**U.S. Cl. 332—19** **8 Claims**




1. An indirect frequency modulator comprising:

first oscillator means for providing a continuous periodic input reference signal;

a phase locked loop connected to said first oscillator means including:

second oscillator means for voltage to frequency conversion,

phase detector means disposed within said phase locked loop and connected to said first oscillator means for comparing the phase of the input reference signal and the signal generated by said second oscillator means and generating an error signal proportional to any phase difference of the two signals,

low-pass filter means disposed within said phase locked loop and located between said phase detector means and said second oscillator means for receiving, filtering and delivering said error signal to said second oscillator means,

a feedback loop from said second oscillator means to said phase detector means, and

a frequency divider disposed within said phase locked loop and located in said feedback loop for delivering said signal generated by said second oscillator means to said phase detector means;

modulating signal generating means connected through integrating means to said phase locked loop between said low-pass filter means and said second oscillator means for indirect frequency modulating said input reference signal.

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## 4,110,708
## MULTICHANNEL MODULATION SYSTEM INCLUDING AUTOMATIC GAIN SHIFTER

**Geoffrey N. Mendenhall, Quincy, Ill., assignor to Harris Corporation, Cleveland, Ohio**

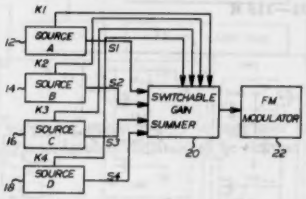
**Filed Mar. 25, 1977, Ser. No. 781,160**
**Int. Cl.[2] H03C 3/00**
**U.S. Cl. 332—21** **4 Claims**

1. A multichannel modulating system comprising:

a modulator for modulating a carrier signal in accordance with a composite signal comprised of a plurality of component signals, wherein the modulation of said carrier must be controlled by controlling the amplitude of said composite signal;

a plurality of component signal sources for each generating one of said component signals, including means associated with each of said sources for selectively providing or not providing the associated said signal to a signal summer means, and for generating a control signal concurrently therewith having a binary state indicating whether the associated component signal is or is not being provided; and,

signal summer means for combining said component signals




to form said composite signal which is supplied to said modulator and having a gain control input responsive to said binary control signals for automatically selecting the gain of said signal summer so that the peak amplitude of said composite signal will remain constant regardless of the use or non-use of said component signal sources, thereby automatically controlling modulation of said carrier.

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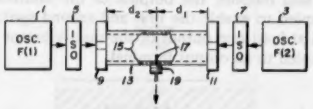
## 4,110,709
## APPARATUS FOR COUPLING MICROWAVE ENERGY FROM TWO OSCILLATORS TO A COMMON TRANSMISSION LINE

**Walter Ransom Day, Jr., Menlo Park, Calif., assignor to Litton Systems, Inc., San Carlos, Calif.**

**Filed Jan. 31, 1977, Ser. No. 764,008**
**Int. Cl.[2] H01P 5/12; H03H 7/46**
**U.S. Cl. 333—6** **8 Claims**




1. A microwave system which includes:

a first oscillator having a waveguide type output for generating a microwave frequency signal of frequency $F_{(1)}$;

a second oscillator having a waveguide type output for generating a microwave frequency signal of frequency $F_{(2)}$; said first frequency $F_{(1)}$ being different from said second frequency $F_{(2)}$ by a difference $\Delta F$;

a rectangular waveguide having first and second ends for receiving microwave frequency signals, said waveguide being of a predetermined length L extending between said ends; said predetermined length being different from a one-half guide wavelength or multiple thereof at either of the frequencies $F_{(1)}$ and $F_{(2)}$ for making said line non-resonant at such frequencies;

first means associated with said first oscillator for coupling the output of said first oscillator means to the first end of said waveguide;

second means associated with said second oscillator for coupling the output of said second oscillator to the second end of said waveguide;

said first means possessing the characteristic of passing microwave frequency signals $F_{(1)}$ between said waveguide and said first oscillator and essentially reflecting microwave signals of frequency $F_{(2)}$ between said waveguide and said first oscillator at said first waveguide end;

said second means possessing the characteristic of passing microwave signals of frequency $F_{(2)}$ between said wave-

guide and said second oscillator and essentially reflecting microwave signals of frequency $F_{(1)}$ between said waveguide and said second oscillator at said second waveguide end; and

a microwave energy coupling probe for coupling microwave energy from within the waveguide, said probe being positioned at a predetermined location along said waveguides between the first and second ends; said location being defined by a distance of $(2N_a+1)\lambda g_1/4$ at frequency $F_{(1)}$ from said second waveguide end and $(2N_b+1)\lambda g_2/4$ at frequency $F_{(2)}$ from said first waveguide end, where $N_a$ is zero or an integer 1, 2 . . . *n*, $N_b$ is zero or an integer 1, 2 . . . *n*, $\lambda g_1$ is the in-the-guide wavelength of signals of frequency $F_{(1)}$ and $\lambda g_2$ is the in-the-guide wavelength of frequencies $F_{(2)}$; and

coaxial type ferrite isolator means having a pass band characteristic which includes signals of frequency $F_{(1)}$ and $F_{(2)}$; and wherein said microwave frequency coupling probe is coupled to an input of said isolator means; and coaxial type connector means coupled to an output of said isolator means for permitting signals to be coupled to a coaxial type transmission line.

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**4,110,710**

## MICROWAVE BANK BRANCHING ARRANGEMENTS

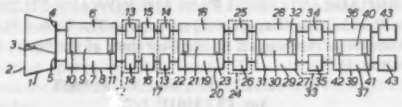
**Barry Kenneth Watson, Witham, England, assignor to The Marconi Company Limited, Chelmsford, England**

**Filed Jan. 7, 1977, Ser. No. 757,558**

**Claims priority, application United Kingdom, Jan. 20, 1976, 2223/76**

**Int. Cl.² H01P *5/18***

**U.S. Cl. 333—10** **8 Claims**



5. A microwave band branching arrangement for successively coupling out frequency sub-bands germane to a broad frequency band, comprising bifurcation means for dividing applied microwave energy into two parallel paths and a series of successive center excited coupler means for sequentially coupling out different frequency sub-bands of said energy, each coupler means comprising two outer waveguide sections, each forming part of one of said two parallel paths, and an inner waveguide section coupled with said outer waveguide sections and being provided for taking off the energy of a respective frequency sub-band, that one coupler means which is provided for coupling out the highest frequency sub-band being disposed directly behind said bifurcation means and ahead of the remaining coupler means, one of said parallel paths including a reflection low pass filter connected to one outer waveguide of said one coupler means and a 90° phase shifter connected to such filter, and the other parallel path including a second 90° phase shifter connected to the other outer waveguide section of said one coupler means and a second reflection low pass filter connected to said second phase shifter.

**4,110,711**

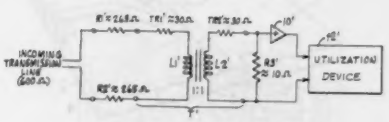
## VOICE/DATA RECEIVER COUPLED WITH A TRANSMISSION LINE THROUGH AN INPUT TRANSFORMER WORKING INTO AN IMPEDANCE APPROACHING A SHORT CIRCUIT

**Mauro Luigi Gaetano, Woodbridge, Va., and Ambroz Karol Skrovanek, Bethesda, Md., assignors to Harvey Hubbell, Incorporated, Orange, Conn.**

**Filed Feb. 8, 1977, Ser. No. 766,588**

**Int. Cl.² H03H *7/38***

**U.S. Cl. 333—32** **10 Claims**




1. A device for receiving voice/data communication transmitted over a transmission line which has a selected characteristic impedance comprising:

an input transformer having a primary and a secondary winding inductively coupled to each other, each winding having resistive impedance which is substantially less than the characteristic impedance of the transmission line;

a first impedance network connected in series with the resistive impedance of the primary winding of the input transformer and having resistive impedance of the order of the characteristic impedance of the transmission line, said first impedance network being connected to the transmission line;

a second impedance network connected to the secondary winding of the input transformer and having resistive impedance which is a small fraction of the characteristic impedance of the transmission line;

the combined impedance of the first and second impedance networks and the resistive impedances of the windings being the impedance in which the transmission line is terminated and said combined impedance being approximately equal to the characteristic impedance of the transmission line; and

a utilization network connected to the second impedance network to receive signals transmitted over said transmission line.

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**4,110,712**

## MICROSTRIP CIRCUIT HAVING COPLANAR WAVEGUIDE PORT

**Ronald George Morris, Worcester, England, assignor to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England**

**Continuation-in-part of Ser. No. 682,861, May 3, 1976, abandoned. This application May 18, 1977, Ser. No. 798,210**

**Claims priority, application United Kingdom, May 14, 1975, 20470/75**

**Int. Cl.² H01P *3/08***

**U.S. Cl. 333—33** **5 Claims**

1. A microstrip component comprising:

a closed box,

a microstrip circuit mounted entirely within the box,

at least one electrical coaxial connector having a central electrode which extends through a hole in a side wall of the box for making electrical connection to the circuit from the exterior of the box,

the microstrip circuit comprising:

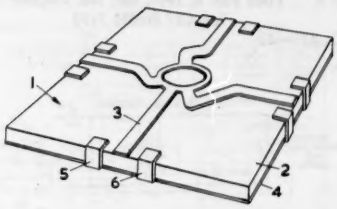
a dielectric substrate,

an electrically conducting circuit including at least one port section which extends on one surface of said sub-

strate to an edge of said substrate for connection with said central electrode,

an electrically conducting ground plane electrode on the other surface of said substrate, and

two thin electrically conducting strips extending integrally from said ground plane electrode around an edge of said substrate and onto said one surface at positions




either side of, but electrically isolated from said port section with the minimum distance between said strips being substantially equal to the diameter of said hole,

the dimensions of the connector, central electrode, hole, and microstrip circuit being arranged to provide substantially the same characteristic impedance throughout with minimal reflecting discontinuities.

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**4,110,713**

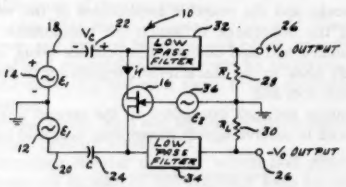
## LOW OFFSET FIELD EFFECT TRANSISTOR CORRELATOR CIRCUIT

**Gayle Patrick Martin, Indialantic, Fla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Nov. 19, 1976, Ser. No. 743,386**

**Int. Cl.[2] H03H** *7/02, 7/48;* **G06F** *15/34;* **H03H** *7/46*

**U.S. Cl. 333—70 R** **1 Claim**




1. A low offset field effect transistor correlator circuit for adaptive processors comprising: a field effect transistor means so constructed as to include interchangeable source and drain terminals and gate means for controlling the resistivity in the transistor means; a first signal input means connected to the source and drain terminals; capacitor means connected between the first signal means and the source and drain terminal means; a second signal input means connected to the said transistor gate means; signal output means; low pass filter means connecting the said transistor source and drain terminals and the signal output means, and load resistor means connected between the output from the source and output from the drain terminals.

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**4,110,714**

## SURFACE ACOUSTIC WAVE FILTER

**Oberdan W. Otto, Los Angeles, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.**

**Filed Jan. 5, 1977, Ser. No. 756,929**

**Int. Cl.[2] H03H** *9/26, 9/04, 9/30, 9/32*

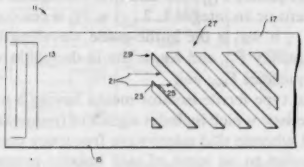
**U.S. Cl. 333—72** **4 Claims**

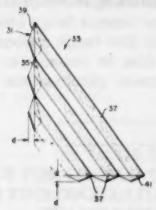
1. A surface acoustic wave filter comprising:

a substrate of material capable of supporting propagating surface acoustic wave energy;

transducer means including an input transducer disposed on said surface for converting electromagnetic energy to surface acoustic wave energy in said substrate with normal mode straight crested phase fronts propagating along a beam path in said surface in a predetermined direction;

reflective means including a surface acoustic wave reflective array disposed on said surface in said path and including spaced parallel elements having longitudinal axes angu-





larly oriented with respect to said predetermined direction, and supporting normal mode, sawtooth-shaped phase fronts within the reflective array region; and

wavefront matching means including matching structures disposed adjacent the leading and trailing ends of said elements of said reflective array for respectively converting the normal mode phasefront shape of said propagating energy outside said reflective array region to the normal mode phasefront shape of said propagating energy inside said reflective array region, and the reverse thereof.

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**4,110,715**

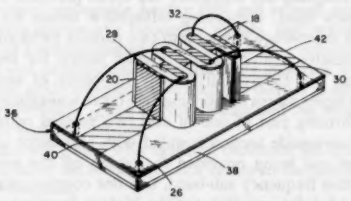
## BROADBAND HIGH PASS MICROWAVE FILTER

**John Reindel, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jul. 27, 1977, Ser. No. 819,637**

**Int. Cl.[2] H01P** *1/20*

**U.S. Cl. 333—73 S** **6 Claims**



1. A broadband high pass microwave filter comprising:

a thin strip of dielectric material having first and second surfaces on opposite sides thereof;

a first series of spaced metallic capacitor plates disposed on said first surface;

a second series of spaced metallic capacitor plates disposed on said second surface;

one plate of said first and second series of plates being a first

end plate positioned at one end of said dielectric strip and another plate of said first and second series of plates being a second end plate positioned at the other end of said dielectric strip and all other plates being intermediate plates;

each intermediate plate of said first series of plates overlapping at least a portion of two adjacent plates of said second series of plates and each end plate overlapping at least a portion of one intermediate plate on the opposite side of said dielectric strip therefrom;

said dielectric strip being folded over and compressed in accordian-like fashion such that each intermediate plate is also folded over;

a plurality of electrical wires mechanically and electrically connected to selected ones of said intermediate plates; and

a substrate on which said folded-over dielectric strip is supported.

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**4,110,716**

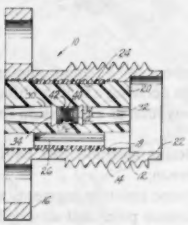
**D.C. BLOCK CONNECTORS**

**Nick C. Nikitas, 41 Choate St., Danvers, Mass. 01923**

**Filed Nov. 1, 1976, Ser. No. 737,478**

**Int. Cl.[2] H01P** *1/00;* **H01R** *5/00*

**U.S. Cl. 333—97 R** **8 Claims**



1. A D.C. block connector for microwave applications comprising an outer conductive shell, a pair of aligned inner conductors each formed with a flat inner end and mounted co-axially with the shell, an insulator between the shell and the inner conductors fixedly retained in the shell and formed with a longitudinal perforation into which the inner conductors are interference fitted and secured with their inner ends in facing relation, a ceramic capacitor smaller than the ends of the inner conductors, mounted in the perforation between the inner ends of the conductors and an axially compressible electrically conductive spring member loosely fitted in the perforation between the capacitor and the end surface of the adjacent inner conductor.

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**4,110,717**

**CIRCUIT BREAKER**

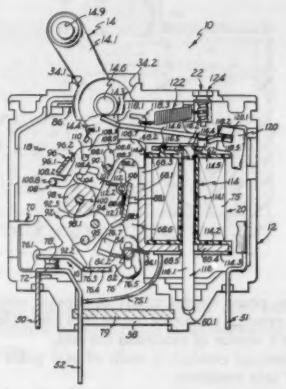
**Aime J. Grenier, North Attleboro, Mass., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Dec. 30, 1976, Ser. No. 755,514**

**Int. Cl.[2] H01H** *73/00, 77/00, 3/00*

**U.S. Cl. 335—22** **50 Claims**

1. A circuit breaker comprising a housing, contact means movable in the housing between an open circuit position and a closed circuit position, means biasing the contact means to open circuit position, operating means extending from the housing to be manually movable between corresponding open and closed circuit positions, circuit responsive means movable from a rest position to an actuating position on the occurence of a predetermined condition in said circuit, and a linkage connecting the operating means to the contact means, said linkage biasing a first link pivotally connected to the operating means, first latch means engaged with the contact means and pivotally connected to the first link means for movement between a latching position permitting the contact means to be moved between open and closed circuit positions in response to manual movement of the operating means between corresponding open and closed circuit positions and an unlatching position permitting the contact means to move to open circuit position in response to the biasing means, independently of the position of the operating means, said first latch means having cam mean to be engaged for holding the first latch means in the latching position thereof, second link means having cam follower means, said second link means being pivotally connected to the first link means for movement between a first position



engaging the cam follower means with said cam means for holding the first latch means in its latching position and a second position permitting the first latch means to move to its unlatching position, second latch means detachably latching the second link means in the first position thereof, and trip means responsive to movement of the circuit responsive means to said actuating position for unlatching the second link means to permit the contact means to move to said open circuit position in response to the biasing means on the occurrence of said predetermined condition in said circuit.

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**4,110,718**

**MAGNETIC STRUCTURE, PARTICULARLY PERMANENT MAGNET FOR MOTOR FIELDS, AND METHOD**

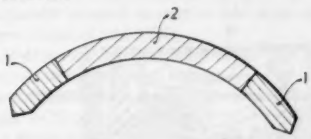
**Frank Odor, Bietigheim; Adolf Mohr, Buhlertal, and Klaus Bolenz, Buhl, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Oct. 1, 1975, Ser. No. 618,574**

**Claims priority, application Fed. Rep. of Germany, Jun. 20, 1975, 2527461**

**Int. Cl.[2] H01F** *1/08*

**U.S. Cl. 335—296** **17 Claims**

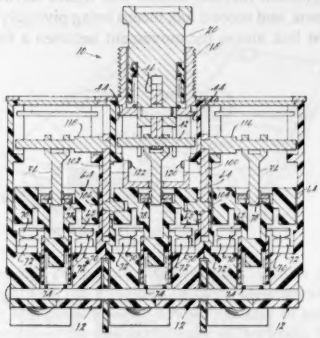


1. Magnet structure having a ferrite body forming an extended surface and which is characterized in that it consists, along its surface extent, of at least two zones which are, each, made of a permanently magnetizable ferrite material having magnetic characteristics which differ from each other, one material (2) having a higher remanence, or retentivity ($B_r$) and the other material (1) having a higher coercive force, or coercivity ($_jH_c$) to form a magnet structure, the magnetic characteristics of which differ along a surface dimension thereof.

## 4,110,719
## THREE PHASE CIRCUIT BREAKER

Joseph F. Kirkup, Parma, Mich., assignor to Mechanical Products, Jackson, Mich.

Filed Apr. 11, 1977, Ser. No. 786,062
Int. Cl.[2] H01H *71/16*
U.S. Cl. 337—46 6 Claims

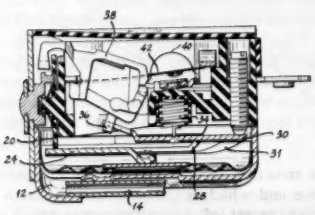


1. A three phase electrical circuit breaker comprising:
a pair of external terminals for each of said poles for connection to a source of electrical current,
a fixed internal contact in each of said poles connected to one of said terminals,
current responsive means in each of said poles electrically connected to the other of said terminals,
a contact carrier in each of said poles having a movable contact thereon and movable between a closed and open condition with respect to said fixed internal contact to make or break an electrical circuit through said poles, and
a thermal latch element in each of said poles for maintaining the contact carrier therein in the closed condition, said thermal latch being controlled by said current responsive means so as to effect release of said latch permitting said contact carrier to move to the contact's open condition, and
a common trip linkage carried by the contact carrier in one of said poles, said common trip linkage comprising means for supporting the thermal latch element in the other poles of said circuit breaker.

## 4,110,720
## THERMOSTATIC CONTROL

Charles R. Smith, West Allis, Wis., assignor to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Dec. 22, 1976, Ser. No. 753,416
Int. Cl.[2] H01H *37/22*
U.S. Cl. 337—319 4 Claims

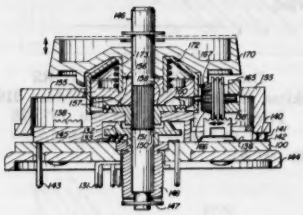


1. A thermostatic control having a calibrated thermal responsive power element, a toggle and snap switch mechanism operated by said element, a drive lever engaged with said mechanism, an adjustable range lever associated with said lever, and a flexible leaf member to connect said range lever to said drive lever; said control characterized in that said range and drive levers are the only force multiplying transmission means between said power element and said toggle and snap switch mechanism.

## 4,110,721
## ADJUSTABLE POTENTIOMETER ASSEMBLY

Mutsuo Nakanishi, Villa Park, and Hans Schmidt, Schiller Park, both of Ill., assignors to Quasar Electronics Corporation, Franklin Park, Ill.

Division of Ser. No. 580,541, May 27, 1975, Pat. No. 4,050,050.
This application Jan. 14, 1977, Ser. No. 759,346
Int. Cl.[2] H01C *10/16*
U.S. Cl. 338—128 2 Claims

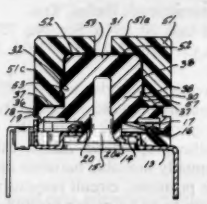


1. A resistive element for a potentiometer assembly particularly suited for use in deriving a tuning voltage for a multiband, wave-signal receiver, such as a television receiver, comprising in combination:
a flat non-conductive base member having a central reference point thereon;
a plurality of arcuate resistive segments arranged in a circle about said reference point and attached to said base member, said resistive segments each having a predetermined width and a predetermined arcuate length and located at the same radius from said reference point;
first conductive means on said base member coupled with a first end of each of said segments for connection with a first voltage supply terminal; and
second conductive means on said base member coupled with the second end of each of said arcuate resistive elements for connection with a second voltage supply terminal.

## 4,110,722
## VARIABLE RESISTANCE CONTROL

Paul C. Brendle, Streetsville, and Brian B. Clarkson, Brampton, both of Canada, assignors to CTS Corporation, Elkhart, Ind.

Filed Jul. 18, 1977, Ser. No. 816,314
Int. Cl.[2] H01C *10/34*
U.S. Cl. 338—174 10 Claims



1. A variable resistance control comprising a resistance element and a collector, a contactor wipably engaging the collector and the resistance element intermediate the ends thereof, a driver constrained to rotate with the contactor, a first member integral with the driver and defined by an out-

wardly extending cylindrical coaxial hub, an annular ring disposed on the hub in spaced relationship to the driver and having a diameter larger than the diameter of the hub, a first clutch face defined by a plurality of axial knurls disposed about the periphery of the first member, a second member having an axially extending cylindrical bore, a second clutch face defined by a plurality of knurls disposed within the bore, the second member having an annular recess provided within the bore and having an inner diameter larger than the inner diameter of the bore, the hub being received within the bore, the first and second clutch faces clutchingly engaging each other, the annular ring nesting within the annular recess and rotatably interlocking the second member to the first member.

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**4,110,723**

## ULTRASONIC APPARATUS FOR MEDICAL DIAGNOSIS

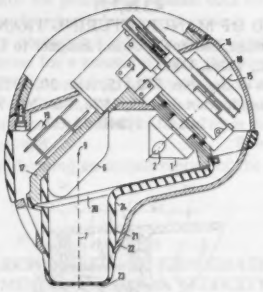
**Walter Hetz, Adam-Kraftstr. 17, and Richard Soldner, Hedenusstr. 31, both of 8520 Erlangen, Germany**

**Filed Mar. 11, 1975, Ser. No. 557,384**

**Claims priority, application Fed. Rep. of Germany, Mar. 27, 1974, 2414777**

**Int. Cl.² G01S *9/66***

**U.S. Cl. 340—1 R** **4 Claims**



1. In an ultrasonic apparatus for medical diagnosis operating pursuant to the impulse-echo method, including a cylindrical parabola reflector; at least one ultrasonic transducer rotatably positioned in the focal line of said reflector for the transmission and receipt of ultrasonic signals; and means for displacing the ultrasonic beam transmitted from said transducer upon rotation thereof in a parallel plane after reflection by said reflector in the context of a line-by-line image build-up, wherein the current receiving direction coincides with the transmission direction, the improvement comprising: means supporting said parabola reflector and said ultrasonic transducer for pivotable motion about a transverse axis, said transverse axis being oriented to facilitate the scanning of different object sectional planes responsive to tilting of said reflector; a housing having an inlet and outlet aperture for the ultrasonic radiation, said reflector being located in said housing, said ultrasonic transducer being rotatably supported on said housing; a further housing encompassing said ultrasonic apparatus, said reflector housing being pivotably supported within said further housing.

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**4,110,724**

## APPARATUS FOR TRANSMISSION OF MESSAGES BY MEANS OF ELECTROMAGNETIC WAVES

**Johannes Peters, Deisenhofen near Munich, Fed. Rep. of Germany, assignor to Bolkow Gesellschaft mit beschrankter Haftung, Ottobrunn, Fed. Rep. of Germany**

**Filed Jun. 25, 1964, Ser. No. 378,077**

**Int. Cl.² H04B *1/034***

**U.S. Cl. 340—4 A** **7 Claims**

1. Apparatus for long-range transmissions of messages by means of electromagnetic waves, comprising a long-wave transmitting plant including a message-storing unit, a transmitter, an antenna whose length equals a quarter length of the emitted waves or a multiple thereof, and a missile for hoisting said antenna, a parachute detachably connected to said missile, an elastic cord, said parachute being connected to said antenna

by means of said elastic cord, said elastic cord being dimensioned in accordance with the required antenna dimensions and transmission time.

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**4,110,725**

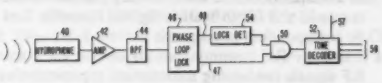
## SEQUENTIAL TONE ACOUSTIC COMMAND LINK

**Kenneth J. Petrosky, Glen Burnie, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Apr. 14, 1977, Ser. No. 787,633**

**Int. Cl.² H04B *11/00*; H04Q *9/02***

**U.S. Cl. 340—5 R** **9 Claims**




1. A receiver for an acoustic transmission system wherein a multi-tone code signal is acoustically transmitted, comprising:

(A) transducer means responsive to said acoustically transmitted multi-tone code signal for providing a corresponding electrical multi-tone code input signal;

(B) a phase lock loop circuit including a VCO and a phase comparator adapted to receive said input signal and the output signal of said VCO;

(C) said phase comparator being of the type to provide, in response to its two input signals,

(i) an output control signal for governing the frequency of said VCO output signal, and

(ii) a phase output signal indicative of the degree of lock between said input signal and said VCO output signal, said degree of lock being indicative of the signal-to-noise ratio of said input signal;

(D) gating means operable, when enabled, to pass said VCO output signal;

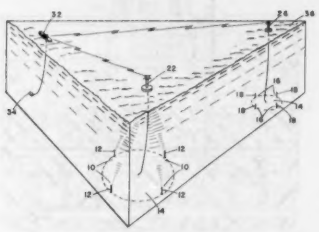
(E) means for enabling said gating means when said signal-to-noise ratio is above a predetermined level; and

(F) a multi-tone code decoder responsive to said passed output signal for providing control signals in accordance with said code signal.

## 4,110,726
## NAVIGATION SYSTEM AND METHOD FOR DETERMINING THE POSITION OF AN OCEAN MINING SHIP

William Thomas Dorrance, and William Richard Wilson, both of El Cajon, Calif., assignors to General Dynamics Corporation Electronics Division, San Diego, Calif.

Filed Jul. 22, 1977, Ser. No. 818,145
Int. Cl.[2] G01S 5/18
U.S. Cl. 340—6 R 4 Claims



1. A system for determining the position of a ship in relation to predetermined positions on the ocean floor, comprising

a plurality of first acoustic addressable transponders respectively located at a first set of predetermined positions on the ocean floor, wherein each of the first acoustic transponders transmits an acoustic ranging response and identification signal in response to receipt of an acoustic ranging interrogation signal;

a plurality of second acoustic addressable transponders respectively located at a second set of predetermined positions on the ocean floor, wherein each of the second acoustic transponders transmits an acoustic ranging response and identification signal in response to receipt of an acoustic ranging interrogation signal;

a first buoy communicatiions system located on a first buoy moored to the ocean floor in the vicinity of the first acoustic transponders, including

a first acoustic communications device for transmitting an acoustic ranging interrogation signal to the first acoustic transponders and for receiving said acoustic ranging response and identification signals from the first acoustic transponders in response thereto,

a first buoy RF communications device for transmitting RF signals containing information representative of the respective propagation delays between transmission of said acoustic ranging response and identification signals from the first acoustic transponders, and

a first buoy RF addressable transponder for transmitting a first RF buoy ranging response and identification signal in response to receipt of an RF ranging interrogation signal;

a second buoy communications system located on a second buoy moored to the ocean floor in the vicinity of the second acoustic transponders, including

a second acoustic communications device for transmitting an acoustic ranging interrogation signal to the second acoustic transponders and for receiving said acoustic ranging response and identification signals from the second acoustic transponders in response thereto,

a second buoy RF communications device for transmitting RF signals containing information representative of the respective propagation delays between transmission of said acoustic ranging interrogation signal and receipt of said acoustic ranging response and identification signals from the second acoustic transponders, and

a second buoy RF addressable transponder for transmitting a second RF buoy ranging response and identification signal in response to receipt of an RF ranging interrogation signal;

a ship communications system located on said ship for transmitting said RF ranging interrogation signals and for receiving said RF buoy ranging response and identification signals in response thereto, and for receiving said RF signals containing said acoustic propagation delay information; and

a data processing system for processing said received RF signals in relation to said RF ranging interrogation signals to determine the position of said ship in relation to said first and second sets of predetermined positions on the ocean floor, including processing means for determining by multilateralization (a) the position of said first buoy in relation to said first set of predetermined positions in response to said received RF signals containing said acoustic propagation delay information respective to the first acoustic transponders, (b) the position of said second buoy in relation to said second set of predetermined positions in response to said received RF signals containing said acoustic propagation delay information respective to the second acoustic transponders, and (c) the position of said ship in relation to said first and second buoys in response to said received RF buoy ranging response and identification signals.

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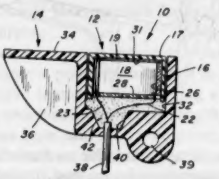
## 4,110,727
## METHOD OF MANUFACTURING TRANSDUCER

Richard P. Kriege, Skiatook, Okla., assignor to Lowrance Electronics, Inc., Tulsa, Okla.

Continuation of Ser. No. 573,315, Apr. 30, 1975, abandoned.
This application Jul. 29, 1976, Ser. No. 709,891
Int. Cl.[2] H04B 13/00
U.S. Cl. 340—10 4 Claims



1. A sonic transducer, comprising:

(a) a transducer housing having an exposed planar face, a cylindrical cavity in the face of selected diameter A, a small diameter opening opposite the face communicating between the bottom of the cavity and the exterior of the housing and a mounting opening through the housing adjacent the side opposite said planar face and in a plane perpendicular to the axis of said cylindrical cavity;

(b) a thin walled cylindrical thermoplastic cup having a planar base having an outer diameter less than A, and an inner diameter B, and having a base of selected thickness T;

(c) a piezoelectric crystal in the form of a shallow circular cylinder, having leads attached to each face, the back face being covered with a thin sheet or cork, the circumferential surface being covered with a thin sheet of cork, the outer diameter of the crystal plus the cork being less than B;

(d) said crystal with the said cork coverings being cemented into said cup with suitable cement, with a thin layer of said cement between the exposed face of said crystal and the inner surface of the bottom of said cup, the cup, crystal, cork and cement forming an integral subassembly;

(e) said cup subassembly being inserted and cemented into said cavity in said housing, with the base of said cup flush with said front face of said housing, and said leads extending through said small diameter opening; and

(f) epoxy material filling all areas of said housing cavity between said cup subassembly and the bottom of said

cavity and sealing said small diameter opening having said leads therein.

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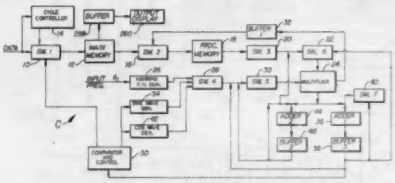
## 4,110,728

## SEISMIC DATA PROCESSING APPARATUS FOR OBTAINING ALPHA VALUES FROM SEISMIC DATA

Lester R. Fuller, Pasadena, and Herbert J. Meyer, Bellaire, both of Tex., assignors to Texaco Inc., New York, N.Y.

Filed Sep. 24, 1976, Ser. No. 726,358
Int. Cl.[2] G01V *1/28*
U.S. Cl. 340—15.5 DP 21 Claims



1. A calculator for processing seismic data to obtain alpha values for subsurface earth layers, comprising:

(a) means for obtaining a measure of the frequency-amplitude spectrum for a seismic trace in the seismic data;

(b) means for determining half-power frequencies of the frequency-amplitude spectrum measure;

(c) means for obtaining the alpha value from the half-power frequencies; and

(d) means for forming an output record of the alpha values obtained.

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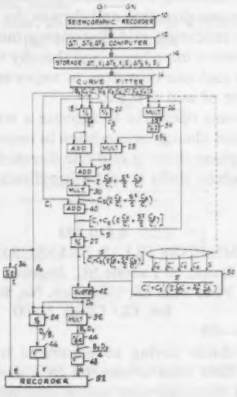
## 4,110,729

## REFLECTION SEISMIC EXPLORATION: DETERMINING INTERVAL VELOCITY IN A SUBSURFACE LAYER

Theodorus L. J. Vreugde, Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Continuation of Ser. No. 549,638, Feb. 13, 1975, abandoned.
This application Oct. 27, 1976, Ser. No. 735,935
Int. Cl.[2] G01V *1/28*
U.S. Cl. 340—15.5 MC 2 Claims



1. A reflection seismic system for obtaining the interval velocity of seismic signals in a subsurface layer in an earth formation bound by a shallower and deeper reflector, the normal travel time in the layer and the layer thickness comprising:

first means for generating a first downwardly propagating seismic signal at a first location,

second means for generating a second downwardly propagating seismic signal at a second location, a known distance from said first location, and at a different time,

a plurality of means for detecting reflections of the seismic signals and providing corresponding signals, and

V, T and H analog computing means connnected to the detecting means for providing signals V, T and H corresponding to the interval velocity, to the normal travel time and to the layer's thickness H, respectively, in accordance with the signals from the detecting means, in which the analog computing means includes means receiving the signals from the detecting means for providing a signal S corresponding to the distance between the generating means and for providing signals corresponding to coefficients $B_0$, $C_0$, $C_1$, $C_2$, $C_3$, $C_0'$, $C_1'$; $C_2'$, $C_3'$ for each detecting means in accordance with the signals from the detecting means and the following equations:

$$T_1 = B_0 + B_2 x^2 + B_3 x^3, \quad (1)$$

$$T_2 = C_0 + C_1 x + C_2 x^2 + C_3 x^3 \text{ and} \quad (2)$$

$$T_3 = C_0' + C_1' x + C_2' x C_3' x^3 \text{ where} \quad (3)$$

$T_1$, $T_2$ and $t_3$ are the time differences of reflection signals from the reflectors at the detecting means, X as used in equation (1) is the distance from the first generating means to the detecting means, and X as used in equations 2 and 3 is the distance from a mid-point between the two generating means to the detecting means, and signal means for providing signals V, T and H in accordance with signals S, $B_0$, $C_0$, $C_1$, $C_2$, $C_3$, $C_0'$, $C_1'$, $C_2'$ and $C_3'$.

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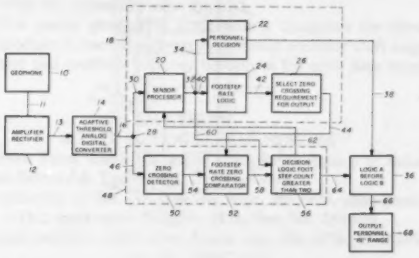
## 4,110,730

## RATE SENSITIVE SYSTEM FOR A SEISMIC SENSING RANGE CONTAINMENT APPARATUS

Charles P. Varecka, Bloomington, and Donald M. Merhar, Shorewood, both of Minn., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Continuation-in-part of Ser. No. 681,104, Apr. 28, 1976, abandoned. This application Jun. 23, 1977, Ser. No. 809,270
Int. Cl.[2] H04B *11/00;* G08B *13/22*
U.S. Cl. 340—16 R 4 Claims



1. A rate sensitive system for a seismic sensing range containment device to detect the presence of pedestrian intruders which comprises:

transducer means for receiving seismic vibrations in response to footsteps of a pedestrian and for generating an electrical footstep output signal in response to said seismic vibrations;

amplifier-rectifier means electrically coupled to said transducer means for amplifying and rectifiying said footstep output pulse;

an adaptive threshold analog-digital converter means, electrically coupled to said amplifier-rectifier means having a

threshold value responsive to the amplitude of an ambient seismic background noise level and for being responsive to said footstep output signal generated by said seismic vibrations of said pedestrian intruders, and for generating a digital output signal foot-step signature in response thereto;

personnel classification logic means, electrically coupled to said adaptive threshold analog-digital converter means, for recognizing, counting, and classifying said digital output signals generated in response to individual footsteps of said intruders and for generating an output logic A signal in response to said footsteps;

energy detector loic means, electrically to said adaptive threshold analog-digital converter means and to said personnel classification logic means, for measuring the relative energy contained in said seismic vibrations of said footsteps in terms of a number of "zero crossings" contained within said seismic vibrations of said individual footsteps, said pedestrian intruders being defined as being within a specified sensing range of said range containment device when a number of zero crossings is greater than a zero crossing requirement selected as a function of a footstep rate, and for generating an output logic B signal when said number of zero crossings is greater than said zero crossing requirement selected as a function of said footstep rate; and

logic A before logic B circuit means, electrically coupled to said personnel classification logic means and said energy detector logic means, for generating an "in range" output signal when said personnel classification logic means has identified a personnel seismic signature within said speicified sensing range of said containment device prior to said energy detector means generating said logic B signal.

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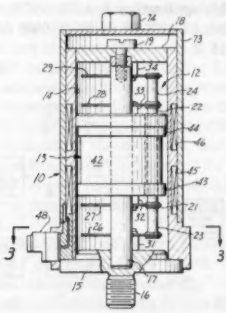
**4,110,731**

## VIBRATION TRANSDUCER WITH IMPROVED VISCOUS DAMPING

**Ebbert Lee Elswood, Sierra Madre, Calif., assignor to Bell & Howell Company, Chicago, Ill.**

**Filed Dec. 30, 1976, Ser. No. 755,536**
**Int. Cl.[2] G01V *1/16***
**U.S. Cl. 340—17 R** **13 Claims**



1. A vibration transducer comprising in combination:

cylinder means for enclosing a viscous damping medium;

piston means in said cylinder means having an outside diameter smaller than the inside diameter of said cylinder means and having a seismic mass;

means for mounting said piston means for axial oscillation in said cylinder means;

means for damping said oscillation of the piston means with said viscous damping medium, including a piston ring having an outside diameter larger than the outside diameter of said piston means to impede flow of said viscous damping medium relative to said oscillating piston means, but smaller than the inside diameter of said cylinder means to provide clearance between said piston ring and said cylinder means; and

means operatively associated with said piston means for sensing said damped oscillation.

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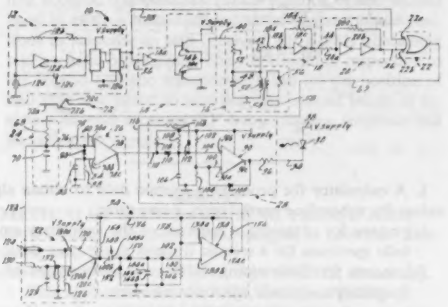
**4,110,732**

## TIRE PRESSURE MONITOR

**William M. Jarocha, Farmington, and Walter K. O'Neil, Southfield, both of Mich., assignors to Eaton Corporation, Cleveland, Ohio**

**Filed Feb. 15, 1977, Ser. No. 768,911**
**Int. Cl.[2] B60C *23/00***
**U.S. Cl. 340—58** **8 Claims**



1. An electronic system for detecting rotation and a change in condition of a pneumatic tire mounted for rotation about an axis, said system comprising:

means for producing a first cyclic signal;

a resonant circuit including reactive means and having an effective impedance, said resonant circuit excited by said first cyclic signal and operative to produce a second cyclic signal shiftable in phase relative to said first signal in response to changes in the effective impedance of said resonant circuit;

first and second means disposed to pass in close proximity of said reactive means in response to rotation of said tire, said first and second means respectively operative when passing said reactive means to momentarily change the effective impedance of said resonant circuit in opposite directions for effecting a momentary phase shift of said second signal in one direction and then in the other direction;

means for rendering said first means ineffective to change said effective impedance, and thereby terminate the phase shifts in said one direction, in response to said change in condition of said tire; and

control means operative to activate a warning device indicating said change in condition in response to termination of said phase shifts in said one direction and continuation of said phase shifts in said other direction.

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**4,110,733**

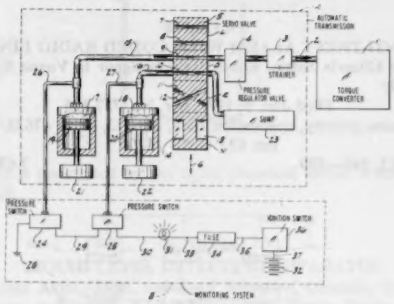
## TRANSMISSION FLUID PRESSURE INDICATOR

**Eddie C. Williams, 65 Labelle St., Jackson, Tenn. 38301**

**Filed Feb. 18, 1976, Ser. No. 659,049**
**Int. Cl.[2] G08B *21/00***
**U.S. Cl. 340—60** **8 Claims**

1. In a vehicle having an automatic transmission with a pressurized fluid inlet connected to a source of pressurized fluid, a first fluid-operated piston chamber and piston connected to a front band, a second fluid operated piston chamber and piston engaged to a rear clutch, a first conduit connected at one end to said first chamber, a second conduit connected at one end to said second chamber, a valve member disposed between said first and second conduits and said pressurized fluid inlet, and means for selectedly positioning said valve

member for connecting said first and second conduits with said pressurized fluid inlet, the improvement comprising a monitor for indicating the fluid pressure within said transmission to demonstrate the fluid level comprising a first fluid pressure-responsive switch, means connecting said first switch and said first conduit, a second fluid pressure responsive switch, means connecting said second switch and said second conduit, a




source of electrical power, a signaling device, and circuit-forming means interconnecting said source of electrical power, said signaling device and said first and second switches whereby when the fluid pressure within both of said first and second conduits descends below a predetermined level both said first and second switches are affected for causing responding indicating action of said signaling device.

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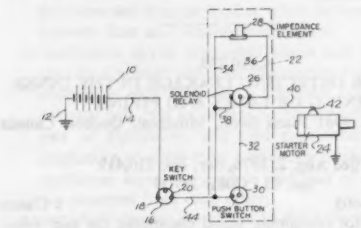
**4,110,734**

## ANTI-THEFT STARTING SYSTEM

**Henry D. Lepore, 26 South St., Marlboro, Mass. 01752, and Perry J. Saidman, Potomac, Md., assignors to Henry D. Lepore, Marlboro, Mass.**

**Filed Mar. 26, 1976, Ser. No. 670,676**
**Int. Cl.² B60R 25/04**
**U.S. Cl. 340—64** **8 Claims**



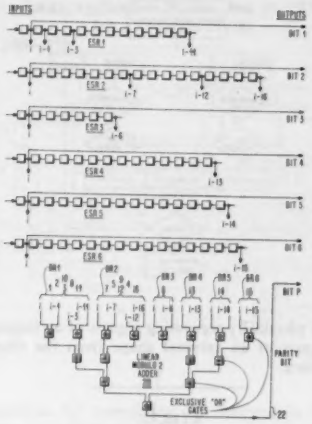

1. In an electric starting system having a voltage source, a starter, and a starter switch connected in series intermediate said voltage source and said starter, the improvement which comprises impedance means connected intermediate said starter switch and said starter for preventing full actuation of said starter, and means connected in series between said starter switch and said starter for selectively bypassing said impedance means.

**4,110,735**

## ERROR DETECTION AND CORRECTION

**Nicholas Frank Maxemchuk, Mercerville, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed May 12, 1977, Ser. No. 796,339**
**Int. Cl.² G06F 11/12**
**U.S. Cl. 340—146.1 AQ** **6 Claims**




1. In an error detection and correction system for transmitting data words together with parity bits in a manner providing relatively greater protection for at least the highest order bit of the data word:

an encoder receptive to the bits of each data word for generating a parity bit according to a self-orthogonal convolutional code constructed by the use of base elements of a difference triangle for each of the bits of the data word, the difference triangles being disjoint, the triangle associated with the highest order bit having a largest number of base elements and the triangle associated with lowest order bit consisting of a single base element, said encoder including:

an encoder shift register for each bit of the data word, each shift register having outputs from the first stage and from stages displaced from the first stage by amounts equal to the values of the base elements of the triangle associated with the respective data bit, and

a first parity generating logic which computes the linear modulo 2 sum of said outputs of said encoder shift registers and provides a parity bit output for each data word.

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**4,110,736**

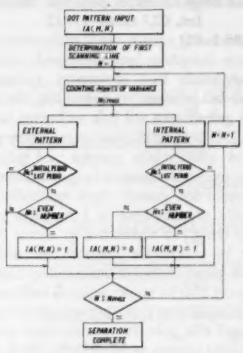
## SHAPE RECOGNITION SYSTEM

**Hidehiko Kono, Akishima, Japan, assignor to Agency of Industrial Science & Technology, Tokyo, Japan**

**Continuation of Ser. No. 560,190, Mar. 20, 1975, abandoned. This application Dec. 29, 1976, Ser. No. 757,971**
**Claims priority, application Japan, Apr. 24, 1974, 49-46291**
**Int. Cl.² G06K 9/12**
**U.S. Cl. 340—146.3 AE** **3 Claims**

1. In a shape recognition system comprising pattern input means for describing shape outline data in terms of binary signals representative of the light intensity of each scanned mesh point; recognition means for converting said binary signals into pattern marking signals of horizontal, right diagonal, vertical, left diagonal, body, space and edge based on adjacent signals in mask logic mesh points; means for recognizing the shape of said pattern marking signals; means for tracking a contour line of said patterns by the use of said pattern marking signals which detect edges in said contour line; means for sequentially recording the number and mesh coordinate of said edges; and means for recognizing the shape of said pat-

terns by comparison of the number of angular turns in said contour line and shape parameters obtained from the number and coordinates of detected edges, the improvement which comprises:



means for physically separating signals of an internal shape and signals of an external shape from the shape to be recognized.

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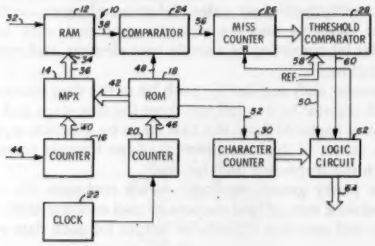
**4,110,737**

**CHARACTER RECOGNITION APPARATUS FOR SERIALLY COMPARING AN UNKNOWN CHARACTER WITH A PLURALITY OF REFERENCE CHARACTERS**

**William David Fahey, Cupertino, Calif., assignor to The Singer Company, Binghamton, N.Y.**

**Filed Aug. 22, 1977, Ser. No. 826,588**
**Int. Cl.[2] G06K *9/12***
**U.S. Cl. 340—146.3 Q** **15 Claims**




1. A character recognition apparatus for recognizing an unknown character having a value at a matrix of discrete locations, said apparatus comprising:

first memory means having at least a first plurality of storage locations each containing an address storing location and a reference storing location and storing information relative to a reference character, said first means being responsive to a count signal and operative to provide a first address signal corresponding to the information stored in a selected one of said address storing locations and a reference signal corresponding to the information stored at the selected reference storing location;

second memory means including a second plurality of storage locations each storing a value of an unknown character at a discrete matrix location, said second plurality of storage locations being greater than said first plurality of storage locations, said second means being responsive to said first address signal and operative to provide a data signal corresponding to the value of the unknown character at the address location;

third means for producing said count signal;

fourth means for applying said count signal to said first means; and

fifth means responsive to said data signal and said reference signal and being operative to provide an output signal when said signals are unlike, said output signal serving as an indication that said unknown character is not said reference character.

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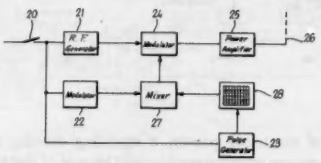
**4,110,738**

**ANTI-THEFT ALARM WITH CODED RADIO LINK**

**Leone Glicerio Sattin, Rome, Italy, assignor to Voxon S.p.A., Italy**

**Filed Jan. 5, 1977, Ser. No. 757,126**
**Claims priority, application Italy, Jan. 13, 1976, 47623/76**
**Int. Cl.[2] G08B *13/00***
**U.S. Cl. 340—539** **7 Claims**




1. A remote signalling system for indicating unauthorized access to a protected area comprising:

A transmitting unit adapted for stationary location at the protected area and including a clock signal generator; first code matrix means connected to said clock signal generator and adapted to be programmed according to a predetermined code and responsive to clock signals from said clock signal generator for supplying a pulse signal sequence indicative of the predetermined code; a radio transmitter connected to said first code matrix means for transmitting radio signals of the pulse signal sequence; and activating means responsive to unauthororized access to the protected area for activating said clock signal generator; and

a receiving unit including a radio receiver for receiving radio signals transmitted by said radio transmitter; and second code matrix means connected to said radio receiver and adapted to be programmed according to the same predetermined code and responsive to receipt of radio signals of the pulse signal sequence for generating an alarm indication.

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**4,110,739**

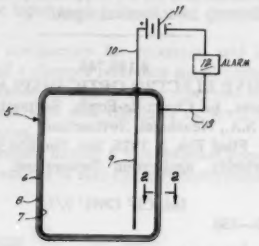
**MEANS FOR DETECTING LEAKAGE IN THE INNER LINING OF TANKS AND PIPING**

**John A. Kidd, 9961 Plaza Blvd., Montreal, Quebec, Canada (H1H 4L5)**

**Filed Aug. 2, 1976, Ser. No. 710,419**
**Int. Cl.[2] G08B *21/00***
**U.S. Cl. 340—605** **2 Claims**

1. A vessel for containing liquid chemicals, the said vessel having a laminate wall structure, including an outer structural wall of fibreglass reinforced polyester, an inner corrosion resistant thermoplastic barrier and an electrical conductive layer constructed of finely divided particles contained in a glass mat, said finely divided particles being selected from the group consisting of metals, carbon and graphite, the said conductive layer positioned between the said outer structural wall and the said inner corrosion resistant barrier, an electrical conductive probe extending into the liquid containing interior of the vessel, and an alarm means electrically connected be-

tween the probe and the conductive layer and adapted to be activated when the inner corrosion resistant barrier of the




vessel is penetrated by the liquid chemical stored within the vessel.

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**4,110,740**

## LIQUID LEVEL DETECTING APPARATUS

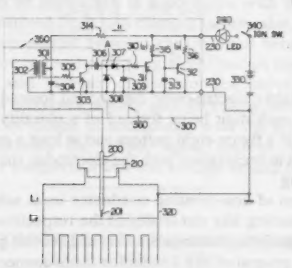
**Sigeyuki Akita, Aichi, and Junji Kitagawa, Okazaki, both of Japan, assignors to Nippon Soken, Inc., Nishio, Japan**

**Filed Jan. 31, 1977, Ser. No. 764,458**

**Claims priority, application Japan, Feb. 9, 1976, 51-13776[U]; Feb. 13, 1976, 51-16155[U]**

**Int. Cl.² G08B *21/00***

**U.S. Cl. 340—620** **10 Claims**




1. A liquid level detecting apparatus for detecting the level of a conductive liquid comprising:

a battery;

a pair of electrodes positioned to be electrically connected through said liquid with each other when the level of said liquid is higher than a predetermined level and electrically disconnected from each other when the level of said liquid is lower than said predetermined level;

an oscillation circuit connected across said battery and including a primary coil and a secondary coil magnetically coupled to each other and a transistor connected to said primary coil, said secondary coil being connected to said pair of electrodes, and said oscillation circuit being adapted to produce from a collector of said transistor an oscillation signal only when said pair of electrodes are disconnected from each other;

a coupling capacitor connected to the collector of said transistor;

a discriminator circuit connected across said battery and to said oscillation circuit via said coupling capacitor, said dicriminator circuit receiving said oscillation signal through said coupling capacitor for converting said oscillator signal into a direct current voltage signal which is higher than a lower voltage side of said battery, and

a display means connected to said discriminator circuit for indicating whether or not the level of said liquid is higher than said predetermined level.

**4,110,741**

## DEVICE FOR MONITORING PHYSICAL ACTIVITY OF PERSONS

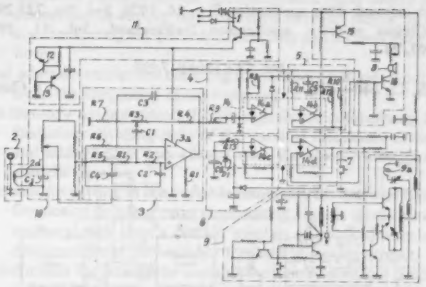
**Jacques Hubert, Saint-Avold; Jean-Marie Ory, Heillecourt; Jean Bottin, Nancy, and Claude Humbert, Heillecourt, all of France, assignors to Societe Chimique des Charbonnages, Paris, France**

**Filed Jan. 21, 1977, Ser. No. 761,483**

**Claims priority, application France, Jan. 20, 1976, 76 01419**

**Int. Cl.² G08B *21/00***

**U.S. Cl. 340—573** **9 Claims**



1. Apparatus for monitoring the movements of a person, comprising an individual monitoring device to be carried by the person whose movements are to be monitored, said device comprising a displacement detector, the displacement detector being arranged to supply a continuously variable signal dependent on the positional changes of the device, signal processing means receiving said signal, the signal processing means comprising a band pass filter for receiving the signals supplied by the displacement detector, the pass band of the filter being such that the said filter will only allow signals due to changes in position of the device consequent upon the monitored person's "normal" movements to pass, and at least one alarm device operatively connected to the signal processing means to provide an alarm in the absence of said signals due to the monitored person's "normal" movements.

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**4,110,742**

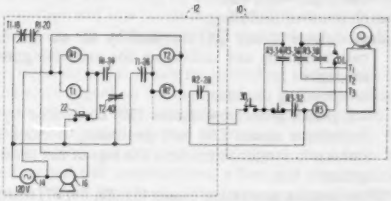
## ALARM CIRCUIT

**J. C. Hawkins, Wise, Va. 24293**

**Filed Jul. 11, 1977, Ser. No. 814,724**

**Int. Cl.² G08B *1/00***

**U.S. Cl. 340—309.1** **3 Claims**



1. A safety circuit for use in connection with power driven industrial machinery comprising:

a start circuit for the machinery;

alarm means;

means interlocked with said start circuit disabling operation thereof until said alarm means has been energized for a predetermined time;

manual means for energizing said alarm;

means in circuit with said alarm for terminating said alarm after a predetermined time;

means responsive to termination of said alarm for enabling said start circuit; and

means for disabling said start circuit in the event that the equipment with which it is associated does not start within a predetermined time following termination of said alarm.

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**4,110,743**

**WIRELESS PAGING RECEIVER**

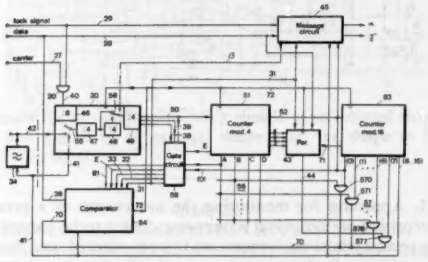
**Hans Zahnd, Bern, Switzerland, assignor to Hasler AG, Bern, Switzerland**

**Continuation-in-part of Ser. No. 595,290, Jul. 11, 1975, abandoned. This application Sep. 14, 1976, Ser. No. 723,297**

**Claims priority, application Switzerland, Jul. 11, 1974, 9497/74**

**Int. Cl.[2] H04B *7/00***

**U.S. Cl. 340—311** **6 Claims**



1. In a wireless paging system, receivers for carrier frequency call telegrams,

each call telegram (**13-16**) consisting of p code words, each code word consisting of *n* bits,

each call telegram including an address (**15**) composed of *m* code words ($w_1$-$w_6$) which are selected from a plurality of code words including selective call code words (A, B, C, D) and one group call word (E);

call telegrams for calling an individually selected receiver have an address (ADABBA) which is individually assigned to the respective receiver and consists only of selective call code words;

group call telegrams for simultaneously calling a selected group of receivers have an address containing those selective call code words which are identical in the addresses of all receivers of the selected group, each code word which is not the same in the addresses of all of these receivers of the selected group is replaced by said group call code word (E);

each receiver including:

demodulator means (**26**) supplied by the carrier frequency call telegrams and delivering for each telegram the bit sequence

corresponding thereto;

clock pulses generating means (**30**) controlled by said demodulator means (**26**) and generating a clock pulse sequence in synchronism with the bits of the received telegram;

bit sequences generating means (**51, 53, 56, 57**) controlled by said clock pulse sequence for generating synchronously to the reception of the bits of the code words of the received telegram a first and a second bit sequence, said first bit sequence is equal to the bit sequence of the individual address (ADABBA) of the receiver, and said second bit sequence (EEEEEE) consists of *m* group call code words (E)

means (**54, 53**) for comparing bit by bit and code word by code word the address of the received code telegram with said first and with said second bit sequence and delivering an output signal at the end of the reception of the address if each code word of the received address has matched with either the respective code word of the first or with that of the second bit sequence; and

signalling means (**34, 35, 36**) supplied by said output signal and delivering an acoustical signal.

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**4,110,744**

**PASSIVE ELECTRO-OPTIC DISPLAY CELL**

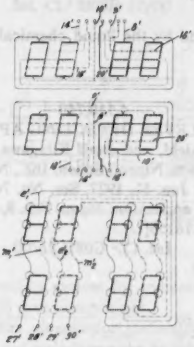
**Claude Laesser, La Chaux-de-Fonds, Switzerland, assignor to Ebauches S.A., Neuchatel, Switzerland**

**Filed Feb. 3, 1976, Ser. No. 654,941**

**Claims priority, application Switzerland, Feb. 10, 1975, 1590/75**

**Int. Cl.[2] G09F *9/32***

**U.S. Cl. 340—336** **3 Claims**



1. A passive electro-optic display cell formed of a plurality of digits, each digit being formed of a plurality of electrodes arranged in a figure eight pattern and at least a pair of counter-electrodes in registration with the electrodes, the improvement comprising

a pattern of non-crossing conductor leads selectively interconnecting like electrodes of the respective digits;

said digits being arranged in first and second groups, with at least several of the conductor leads connecting like electrodes in each group and selected ones of said conductor leads interconnecting different electrodes of the group having digit positions in mirror-like image relationships with each other; and

with selected ones of counter-electrodes of each digit in one group being electrically coupled to each other and to corresponding counter-electrodes of a digit in the other group.

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**4,110,745**

**ANALOG TO DIGITAL CONVERTER**

**Yuichi Ninomiya, Kawasaki, Japan, assignor to Nippon Hoso Kyokai, Tokyo, Japan**

**Filed Oct. 28, 1975, Ser. No. 626,099**

**Claims priority, application Japan, Nov. 6, 1974, 49-127219**

**Int. Cl.[2] H03K *13/175***

**U.S. Cl. 340—347 AD** **6 Claims**

1. An analog to digital converter wherein an input analog signal having periodically appearing reference dc levels to be converted to a digital signal is compared with at least one reference voltage to produce at least one digital output signal, said analog to digital converter comprising:

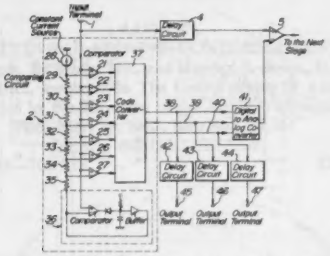
comparator means having at least one signal comparator for comparing said input analog signal with said reference voltage to form said digital output signal,

a series circuit having at least one constant current source and at least one resistor connected in series therewith for supplying said reference voltage to said signal comparator, and

dc clamping means receiving said input analog signal for periodically clamping the level of said reference voltage at a constant dc voltage level related to said reference dc level in the input analog signal, said dc clamping means including

a clamper comparator for receiving said input analog signal and a clamper reference signal corresponding to said reference voltage for comparing said clamper reference signal with said reference dc level in said input analog signal,

switching means having a first terminal connected to an output terminal of said clamper comparator,



a capacitor connected between a second terminal of said switching means and ground, said capacitor being charged or discharged in accordance with the output signal derived from said clamper comparator, and

a buffer connected between the junction between said capacitor and said switching means and an input terminal of said clamper comparator for supplying said clamper reference signal, said switching means being opened or closed in accordance with the level difference between the output signal derived from said clamper comparator and the voltage at said junction.

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**4,110,746**

## A-D CONVERTER HAVING NONLINEAR CHARACTERISTICS

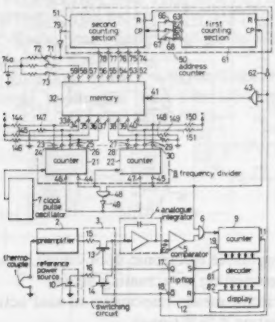
**Hikaru Furukawa; Masakazu Mitamura, both of Gyoda, and Kenji Higuchi, Ageo, all of Japan, assignors to Takeda Riken Kogyo Kabushikikaisha, Tokyo, Japan**

**Filed Jun. 21, 1976, Ser. No. 697,897**

**Claims priority, application Japan, Jun. 23, 1975, 50-77205**

**Int. Cl.[2] H03K** *13/02*

**U.S. Cl. 340—347 NT** **5 Claims**



1. An A-D converter response to an input voltage comprising:

integrating means;

a source of input voltage;

a source of a reference signal opposite in polarity to the input voltage;

a reference clock pulse source;

a counter;

a control logical circuit controlled by the output from the counter to supply the input voltage to the integrating means so that it achieves a first integration until the count value of the counter reaches a preset value from a predetermined one whereafter the integrating means then achieves second integration of the reference signal;

a variable frequency divider circuit for frequency dividing the clock pulses from the reference clock pulse source and connected to supply the frequency divided pulses to the counter during the periods of said first and second integrations;

an address counter for counting the frequency divided pulses from the frequency divider circuit;

a memory having stored therein signals for determining the frequency dividing ratio of the variable frequency divider and addressed in accordance with the count value of the address counter;

means for setting in the variable frequency divider one of the frequency dividing ratio determining signals stored in the memory each time a certain number of output pulses are delivered from the variable frequency divider circuit;

and means for setting the variable frequency dividing ratio at a fixed frequency dividing ratio other than unity in the period of the first integration.

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**4,110,747**

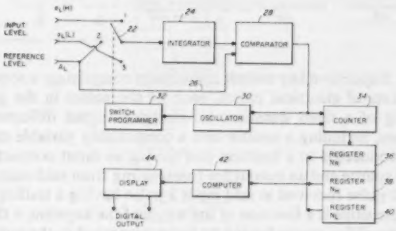
## APPARATUS FOR PRODUCING ANALOG-TO-DIGITAL CONVERSIONS

**Paul J. LaBrie, 11 Hemenway Rd., Salem, Mass. 01970**

**Filed Feb. 2, 1976, Ser. No. 654,298**

**Int. Cl.[2] H03K** *13/02*

**U.S. Cl. 340—347 NT** **6 Claims**



1. Apparatus for converting an unknown analog electronic signal having high and low levels to a digital electronic signal representing a digital measurement of said unknown analog signal, comprising:

(a) three input signal terminals for providing a high level of an unknown signal to be measured, a low level of an unknown signal to be measured and a reference signal,

(b) timed switch means adapted to connect sequentially to said terminals to produce chopped signals therefrom in predetermined pair combinations, a first pair combination comprised of the high level of the unknown signal and the reference signal, a second pair combination comprised of the low level of the unknown signal and the reference signal, and a third pair combination comprised of the reference signal and the reference signal,

(c) electronic integrating means connected to receive signals from said terminals exclusively through said timed switch means, said integrating means being adapted to combine said chopped signals in said predetermined pair combinations, said integrating means generating an integrated signal for each of said pairs, said timed switch means applying said pairs to said integrating means in a predetermined sequence, said timed switch means alternately ap-

plying to said integrating means for predetermined periods each signal of each said pair in said predetermined sequence, and

(d) comparator means connected to said integrating means and to said reference signal terminal and adapted to provide an output pulse when the amplitude of said integrated signal for each said pair equals said reference signal,

(e) counter means connected to said comparator means, said counter means having enabled and disabled states and plural storage means being selectively accessed to store the output of said counter means.

(f) pulse means for generating a series of clock pulses, said pulse means connected to said counter means, said counter means counting and storing the number of pulses generated by said pulse means during the integration period for each said pair when enabled, said counter means disabled by said comparator means output pulse, and

(g) computer means for processing said counts stored in said storage means, said computer means generating a digital signal representing said unknown analog signal in digital form.

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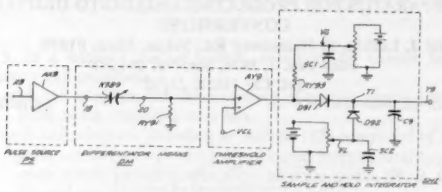
**4,110,748**

## KEYSWITCH WITH HYSTERESIS

**Francis C. Marino, Dix Hills, N.Y., assignor to Burroughs Corporation, Detroit, Mich.**

**Filed Apr. 6, 1976, Ser. No. 674,215**
**Int. Cl.[2] H01G *5/01*; G08C *25/00***
**U.S. Cl. 340—365 C** **10 Claims**



9. Capacitive key switch assemblage comprising: a source of packets of electrical pulses, each of the pulses in the packet being of a fixed duration; an electrical signal differentiator means, including a resistor and a controllably variable capacitor connected to a keystem and having an input connected to said source and an output for transmitting from said output for each pulse received at said input a pulse having a trailing edge whose slope is a function of the travel of the keystem; a threshold amplifier means having an input connected to the output of said differentiator means and an output, said threshold amplifier means accepting those portions of each pulse with a variable trailing edge which fall between two signal levels whereby a pulse is transmitted from the output of said threshold amplifier means having a width which is a function of the trailing edge of the pulse received from said differentiating means; and a sample and hold electrical signal integrator means connected to the output of said threshold amplifier means, for emitting an integrated signal whose amplitude is a function of the duration of the signals emitted by said threshold amplifier means.

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**4,110,749**

## TOUCH DISPLAY TO DIGITAL ENCODING SYSTEM

**Bozidar Janko, and Aris Silzars, both of Portland, Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.**

**Filed May 6, 1977, Ser. No. 794,438**
**Int. Cl.[2] G08B *5/36***
**U.S. Cl. 340—365 C** **4 Claims**

1. A touch display to digital encoding system, comprising:

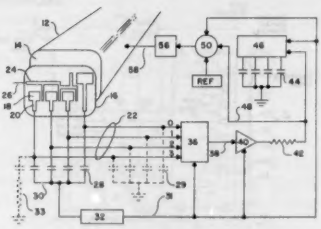
display means including means for providing light images;

means associated with said display means for inputting N data units thereto, said means including touch contact means sensitive to touching by a human body for providing N data units;

electronic recognition circuitry responsive to said N data units for synchronously converting said N data units to discrete elements of information to digitally encode said N data units said circuitry comprising

(a) first means for selecting one out of said N data units and transmitting the selected data unit to a single channel, said first means including means for synchronously selecting said data unit;

(b) second means responsive to said data unit for providing a signal which is a synchronous rectified version of said



data unit, said second means including unity gain amplifier means for rectifying said data unit;

(c) third means responsive to said signal for sychronously providing a filtered signal, said third means including synchronously switched means for filtering said signal;

(d) means for comparing said filtered signal and a reference signal to provide said discrete elements of information; and

means responsive to said discrete elements of information for providing control data, said means also being operatively associated with said display means for inputting said N data units thereto.

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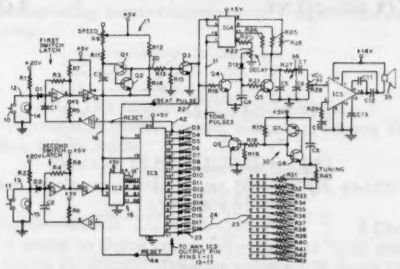
**4,110,750**

## PROGRAMMABLE ELECTRONIC DOOR CHIME

**Bjorn Heyning, Saint Joseph, Mich., and Dennis D. Tremblay, La Salle, Ill., assignors to Heath Company, Benton Harbor, Mich.**

**Filed Oct. 1, 1976, Ser. No. 728,807**
**Int. Cl.[2] G08B *3/00***
**U.S. Cl. 340—384 E** **8 Claims**



1. A programmable electronic door chime comprising:

means for generating an actuating signal;

resettable circuit means responsive to said actuating signal for generating a first signal;

identification circuit means, having a plurality of output terminals, responsive to said first signal to generate a series of clock pulse signals for sequentially energizing said plurality of output terminals, a selected one of said output terminals being connected to said resettable circuit for

providing a reset signal thereto when said selected terminal is energized to terminate said first signal; and

an RC controlled tone generator, for producing output tone signals comprising, in combination, a multivibrator, a capacitance element and a plurality of series connected resistance elements, said generator having a plurality of different tone determining inputs, each comprising a junction point between a different pair of said series connected resistance elements for selective connection to said output terminals and for varying the RC constant controlling said multivibrator to generate a desired sequence of output tone signals in direct response to said clock pulse signals energizing the ones of said terminals connected to said tone determining inputs.

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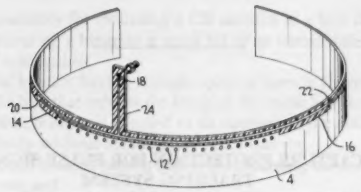
**4,110,751**

## VERY THIN (WRAP-AROUND) CONFORMAL ANTENNA

**Frank Reggia, Bethesda, Md., and Howard S. Jones, Jr., Washington, D.C., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Mar. 10, 1977, Ser. No. 776,161**
**Int. Cl.[2] H01Q *13/18, 1/38***
**U.S. Cl. 343—700 MS** **12 Claims**




1. A thin wrap-around, conformal antenna comprising:

a conformal dielectric substrate;

conductive plating on the interior surface of the substrate;

conductive plating on the exterior surface of the substrate, the plating defining a cavity region for a pair of radiating elements;

shorting means for forming the boundaries of the cavity-backed radiating elements placed along the periphery of the elements except for a single cavity radiating region on each element; and

a stripline feed network for nonsymmetrically coupling energy to the individual radiating elements at selected points along the radiating region whereby microwave energy may be received or transmitted.

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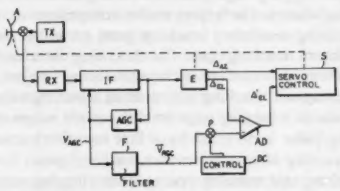
**4,110,752**

## SYSTEMS FOR REDUCING THE ELEVATION ERROR FOR TRACKING RADARS OF LOW HEIGHT TARGETS

**Filippo Neri, Rome, Italy, assignor to Selenia-Industrie Elettroniche Associate S.p.A., Italy**

**Filed Apr. 5, 1977, Ser. No. 784,871**
**Claims priority, application Italy, Feb. 16, 1976, 51311 A/76**
**Int. Cl.[2] G01S *9/02***
**U.S. Cl. 343—7.4** **12 Claims**




1. In a system for the automatic correction of nodding elevation errors of radars tracking targets at low heights, including an antenna, a radar transmitter coupled to the antenna for transmitting radar signals therefrom, a radar receiver coupled to the antenna for receiving radar signals therefrom, intermediate frequency channel circuitry, azimuth error detection circuitry for generating an azimuth error signal, elevation error detection circuitry for generating an elevation error signal, an antenna servo, and coupling means for coupling the antenna servo to the azimuth error detection circuitry, to the elevation error detection circuitry and to the antenna for controlling positioning of the antenna in accordance with the azimuth error signal and the elevation error signal, the improvement in which the coupling means includes elevation error correction circuitry comprising first circuit means for detecting variations of the amplitude of the received radar signals due to the reflection effect at low height and for generating a variation signal indicative thereof, second circuit means for subtracting the variation signal from the elevation error signal to provide a corrected elevation error signal, and third circuit means for applying the corrected elevation error signal to the antenna servo to control the antenna elevation in accordance therewith.

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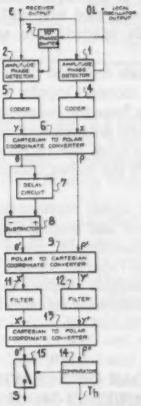
**4,110,753**

## DEVICE FOR PROCESSING SIGNALS FROM A COHERENT PULSE RADAR

**Jacques Sirven, Paris, France, assignor to Thomson-CSF, Paris, France**

**Filed Jan. 31, 1977, Ser. No. 764,518**
**Claims priority, application France, Feb. 3, 1976, 76.02938**
**Int. Cl.[2] G01S *9/44***
**U.S. Cl. 343—8** **7 Claims**




1. A device for processing signals received by a coherent pulse radar, said device containing two amplitude-phase detectors for demodulating in quadrature said radar signals and for delivering respective video signals (X, Y), means for coding the said (X, Y) video signals, first means for converting (X, Y) coded signals representing cartesian coordinates into ($\rho$, $\theta$) signals representing respectively the polar coordinates corresponding to the cartesian coordinates (X, Y), means for delaying and subtracting the signals ($\theta$) received from at least two consecutive repetition periods, delivering a signal ($\theta'$), second means for converting ($\rho$, $\theta'$) signals into (X', Y') signals representing the corresponding cartesian coordinates, means for filtering the said (X', Y') signals and third means for converting the filtered (X'', Y'') signals into ($\rho''$, $\theta''$) signals which are the corresponding polar coordinates, for delivering the signal $\rho''$ representing the amplitude of the echoes received by the radar

and the signal $\theta''$ representing the Doppler speed of the said echoes.

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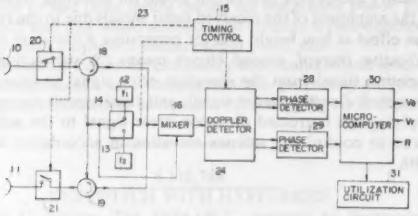
## 4,110,754
## DETECTION OF ANGULAR DISPLACEMENT TO AN OBJECT FROM THE MOVING VEHICLE

Hiroshi Endō, Yokosuka, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed May 27, 1977, Ser. No. 801,315
Claims priority, application Japan, May 29, 1976, 51-61787
Int. Cl.[2] G01S 9/02, 9/44
U.S. Cl. 343—16 R 14 Claims




1. A method for determining the angular displacement of an object in front of a motor vehicle from the center axis of said vehicle, comprising the steps of:

transmitting a first sequence of alternately occurring bursts of energy at first and second frequencies from a first antenna and a second sequence of alternately occurring bursts of energy at first and second frequencies from a second antenna at alternate intervals with the bursts of said first sequence, said first and second antennas being mounted equally spaced from said center axis of said vehicle;

receiving the signals reflected from said object;

deriving first and second Doppler signals from the received signals resulting from the reflection of the bursts transmitted from said first antenna and deriving third and fourth Doppler signals from the received signal resulting from the reflection of the bursts transmitted from said second antenna;

generating a first signal representing the phase difference between said first and second Doppler signals and a second signal representing the phase difference between said third and fourth Doppler signals; and

computing said angular displacement using said first and second phase difference representative signals.

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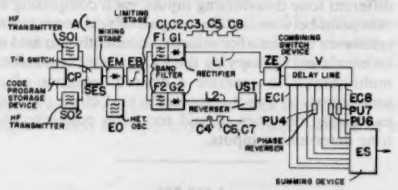
## 4,110,755
## PULSE RADAR DEVICE WITH PHASE- OR FREQUENCY-MODULATION

Anton Zottl, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Sep. 22, 1970, Ser. No. 74,893
Claims priority, application Fed. Rep. of Germany, Sep. 26, 1969, 1948758
Int. Cl.[2] G01S 9/233
U.S. Cl. 343—17.2 PC 1 Claim

1. A pulse-radar device with phase-or frequency-modulation of the transmitting pulses and pulse compression at the receiver, comprising means for the suppression of interference pulses prior to the compression including means providing a hard limitation of the received pulses, means for summing the limited signals and means providing a predetermined threshold level so that only such received signals are released for evaluation which when summed up after compression exceed said predetermined threshold level, said pulses being binary frequency-coded, means for separating the received signals interposed between said means providing a hard limitation and said means for summing the limited signals including two band filters, means interposed at the output of one of said band filters for additionally pole-or phase-reversing the corresponding signals, and a delay device connected to receive signals from said band filters, said delay device having a plurality of distributed taps and operable to provide said binary pulses individually at said taps, and a plurality of 180° phase advancers connected between those taps for one of the two types of binary pulses and said means for summing the limited signals so that those pulses belonging to a reflecting pulse of a modulated transmitting pulse are added at the same time.

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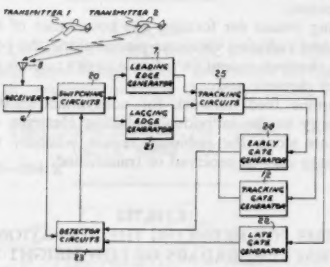
## 4,110,756
## CAPTURE PROTECTION FOR PULSE SIGNAL TRACKING SYSTEM

Philip Kaszerman, West Orange, N.J., assignor to International Telephone & Telegraph Corporation, Nutley, N.J.

Filed Jan. 10, 1972, Ser. No. 216,518
Int. Cl.[2] G01S 9/14
U.S. Cl. 343—7.3 3 Claims




1. A method of separating pulses of a particular signal source from the total signal environment of the type wherein pulses are received in a receiver which passes only the leading or lagging edge of said pulses and a primary tracking gate is generated by a tracking system which allows passage of those leading or lagging edges received during the time of said tracking gate, wherein the improvement comprises:

generating secondary tracking gates on either side of said primary tracking gate for detecting interferring pulses before they coincide with pulses being tracked;

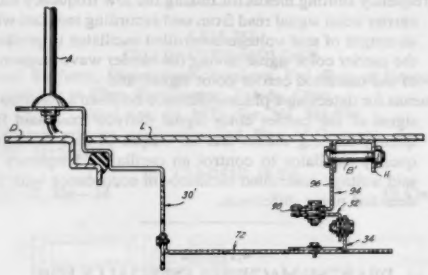
switching said tracking system from a leading edge tracking mode to a lagging edge tracking mode when an interferring pulse is detected by a first secondary tracking gate occurring after said primary tracking gate;

switching said tracking system from a lagging edge tracking mode to a leading edge tracking mode when an interferring pulse is detected by a second secondary tracking gate occurring before said primary tracking gate.

## 4,110,757
## BRACKET ASSEMBLY FOR MOUNTING A CB ANTENNA

Felix P. Sieber, Union, N.J., assignor to BCS Mach. & Mfg. Corp., South Plainfield, N.J.

Filed Dec. 13, 1976, Ser. No. 749,661
Int. Cl.[2] H01Q 1/32
U.S. Cl. 343—715 14 Claims



1. An assembly for mounting a CB antenna to a bolt that is used for securing a hinge to a trunk lid of an automobile, said assembly comprising:

(a) a first bracket having a single opening therein for receiving the bolt that secures the hinge to the trunk lid whereby said first bracket is adapted to be coupled to the automobile body without forming any holes therein;

(b) a second bracket having means for mounting the antenna thereon; and

(c) pivotable joint means coupling said first and said second brackets to each other whereby with the trunk lid closed and with said first bracket secured to the hinge by means of the bolt, a portion of said second bracket with the antenna mounted thereon will be exposed and whereby after manipulation of said joint means about different first and second axes said second bracket with the antenna mounted thereon will be completely contained within the trunk compartment without removing said first bracket from the hinge.

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## 4,110,758
## HIGH QUALITY PRINTING SYSTEM WITH CONSTANT INTERMITTENT TAPE DRIVE

Alfred N. Nelson, and David L. Davis, both of Los Angeles, Calif., assignors to Addressograph Multigraph Corporation, Los Angeles, Calif.

Filed Dec. 22, 1976, Ser. No. 753,440
Int. Cl.[2] G03G 19/00; B65H 17/42
U.S. Cl. 346—74.1 11 Claims

1. Printer apparatus for printing on a print medium comprising:

a tape having a layer of magnetizable images on said tape;

a toning device for applying toner to the magnetic images on said tape;

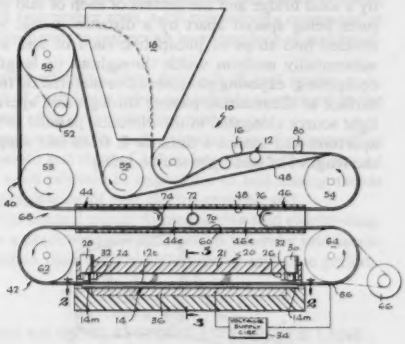
a print medium transport for moving a print medium along a predetermined print medium path that passes adjacent to said tape path at a predetermined transfer location;

transfer means disposed at said transfer location for transferring toner from said tape to said print medium during a time when the tape portion thereat is stationary;

a first transport means for moving said tape substantially continuously along a first tape path portion which extends past said recording head and said toning device;

a second transport means for moving said tape intermittently along a second tape path portion which extends past said transfer location; and

first and second buffers disposed between said first and second transport means, said first buffer positioned to receive tape from said first transport means and said second buffer positioned to receive tape from said second transport means.



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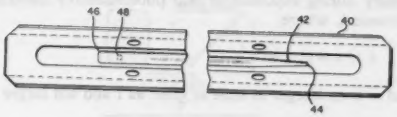
## 4,110,759
## ORIFICE PLATE HOLDER FOR A FLUID JET PRINTING APPARATUS

Leonard G. Stoneburner, Fairborn, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Filed Feb. 3, 1977, Ser. No. 765,116
Int. Cl.[2] G01D 15/18
U.S. Cl. 346—75 11 Claims



1. An orifice plate holder for use in a jet drop printing apparatus wherein an orifice plate having a plurality of orifices is secured thereto for controlled vibrational stimulation of a plurality of filaments of fluid flowing from said orifices, comprising:

a generally rectangular cross sectioned plate, substantially co-extensive with said orifice plate and having an elongated central opening with two end portions defined therein, the walls of said opening being co-extensive with and abutting a vibrating portion of said orifice plate containing said plurality of orifices, said opening being further defined with at least one of said end portions formed by convergingly tapered portions of said walls, said one end portion extending for substantially less than one half of the length of said opening and so configured as to dampen vibration of said orifice plate at a position corresponding to said at least one end portion so as to suppress backwardly directed reflections of waves traveling through said vibrating portion of said orifice plate.

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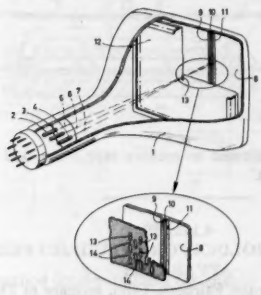
## 4,110,760
## METHOD OF MANUFACTURING A CATHODE RAY TUBE FOR DISPLAYING COLORED PICTURES

Johannes Cornelis Adrianus van Nes, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 26, 1976, Ser. No. 652,075
Claims priority, application Netherlands, Mar. 27, 1975, 7503665
Int. Cl.[2] G03C 5/00
U.S. Cl. 354—1 3 Claims

1. In the method of manufacturing a color cathode-ray tube comprisng a fluorescent screen and a support surface and a shadow mask spaced a distance $q$ from said screen and having

parallel rows of elongate apertures, the proximal ends of each pair of adjacent apertures in each of said rows being separated by a solid bridge and the centers of each of said pairs of apertures being spaced apart by a distance *a*, said screen being divided into strips of phosphors, each of said strips having substantially uniform width throughout its length, the steps comprising: exposing photosensitive material on the entire said surface to illumination passing through said apertures from a light source elongated in the direction parallel to said rows of apertures and spaced a distance L from said support surface, the length l of said light source being



$$l = a \cdot n \cdot (L-q/q)$$

wherein *n* is an integer; and moving the source of light longitudinally during exposure of said photosensitive material by a distance *k*, where

$$k = a\, m\, (L-q/q)$$

and *m* is an integer at least as great as 1 and not larger than *n*.

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**4,110,761**

## COLOR SIGNAL PROCESSING APPARATUS FOR VIDEO SIGNAL RECORDING AND REPRODUCING SYSTEM

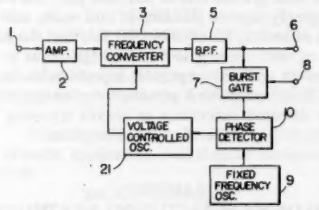
**Yoshizumi Watatani, Machida, Japan, assignor to Hitachi, Ltd., Japan**

**Filed Dec. 9, 1976, Ser. No. 748,906**

**Claims priority, application Japan, Dec. 12, 1975, 50-147337; Dec. 12, 1975, 50-147338; Dec. 12, 1975, 50-147340**

**Int. Cl.[2] H04N *5/76***

**U.S. Cl. 358—4** **6 Claims**




**1**. A recording and reproducing apparatus for recording a color television signal on a recording medium after having frequency shifted a carrier color signal of a color video signal to a low frequency band signal and reproducing the color television signal by frequency shifting the low frequency band carrier color signal read from the recording medium to an original high frequency band signal, comprising:

voltage controlled oscillator means having a center frequency which is equal to a frequency which differs from a carrier wave frequency of the carrier color signal of said color television signal by a carrier wave frequency of the carrier color signal which has been frequency shifted to said low frequency band signal, and including a resonance circuit with a crystal resonator and means for damping a quality factor Q of said resonance circuit;

fixed frequency oscillator means for oscillating at a frequency which is equal to the carrier wave frequency of the carrier color signal of said color television signal;

frequency shifting means for mixing the low frequency band carrier color signal read from said recording medium with an output of said voltage controlled oscillator to produce the carrier color signal having the carrier wave frequency of the unshifted carrier color signal; and

means for detecting a phase difference between a color burst signal of the carrier color signal derived from said frequency shifting means and an output of said fixed frequency oscillator to control an oscillation frequency of said voltage controlled oscillator in accordance with the detected phase difference.

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**4,110,762**

## DRAWING MACHINES ESPECIALLY FOR INTEGRATED CIRCUIT MASKS

**Paul Tigreat, Meylan, France, assignor to Commissariat a l'Energie Atomique, Paris and Societe pour l'Etude et la Fabrication de Circuits Integres Speciaux, Grenoble, both of, France**

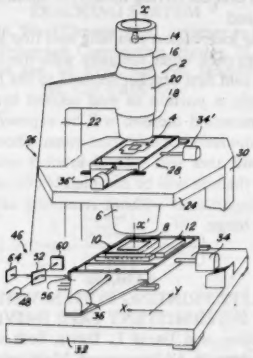
**Continuation of Ser. No. 572,096, Apr. 28, 1975, abandoned.**

**This application Jun. 6, 1977, Ser. No. 803,883**

**Claims priority, application France, May 10, 1974, 74 16288**

**Int. Cl.[2] G02B *5/23*; G03B *41/00, 27/42***

**U.S. Cl. 354—4** **7 Claims**



**1**. A machine for drawing on a photosensitive plate, comprising:

an electro-optical imager having an optic axis *x–x'*, the imager including a plurality of fixed image points arranged in a preselected array,

means for selectively controlling the optical state of each point of the imager at the same time for forming a pattern of a number of points which have an optical state different from the remaining points,

photosensitive plate means aligned with the optic axis of the imager,

the dimensions of each point of the imager corresponding to the smallest detail drawing to be formed on the plate,

means for selectively transmitting a beam of light along the optic axis *x–x'* when said pattern is formed on the imager,

an objective located on the side of the imager opposite the means for transmitting for providing a magnification n and having the axis *x–x'*, said objective being capable of receiving the entire light beam which passes out of said imager,

means for displacing said imager and said photosensitive plate means with respect to each other in a plane at right

angles to the axis $x$-$x'$ and in the two orthogonal directions X and Y,

means for measuring the relative displacement of said imager and of said photosensitive plate in the directions aforesaid,

means for controlling the means which produce the relative displacement of said imager and of said photosensitive plate as a function of the indication of said means for measuring the relative displacement of said imager and of the photosensitive plate.

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**4,110,763**

## CHARACTER HOLDER

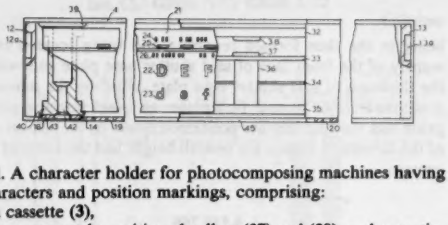
**René Kerfante, Dietzenbach-Steinberg, Fed. Rep. of Germany, assignor to Eltra Corporation, Toledo, Ohio**

**Filed Apr. 26, 1977, Ser. No. 791,078**

**Claims priority, application Fed. Rep. of Germany, Apr. 29, 1976, 7613449[U]**

**Int. Cl.² B41B *15/06***

**U.S. Cl. 354—14** **10 Claims**



1. A character holder for photocomposing machines having characters and position markings, comprising:

a cassette (3),

two separately positioned rollers (27) and (29), and a continuous film tape (21) which leads around said rollers wherein, at least one of said rollers (27) and (29) includes a coupling part accessible from outside of said cassette for rotating said roller, and said one roller is loosely positioned in said cassette so that said one roller can be moved with respect to the other roller through said part to tension said film strip.

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**4,110,764**

## CAMERA SHUTTER

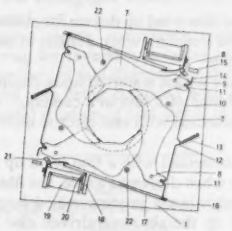
**Martin Heinze, 5 Rütger-Von-Scheven, Duren, and Walter Heinze, 14 Gruner Weg, Hürtgenwald-Gey, both of Germany**

**Filed Dec. 22, 1976, Ser. No. 753,515**

**Claims priority, application Fed. Rep. of Germany, Dec. 22, 1975, 2557885**

**Int. Cl.² G03B *7/08, 9/22***

**U.S. Cl. 354—51** **15 Claims**



1. Electro-mechanically operated control shutter for photographic cameras including a lens and comprising:

(a) at least two shutter lamellae, each lamellae including a shutter portion and a lever portion and being pivotally mounted intermediate said shutter portion and said lever portion, so that said lamellae are swingable in parallel planes for occupying a primary position, wherein such shutter portions overlap each other to block light rays from the lens and occupy an open position wherein said shutter portions move out of the light rays from the lens to define an opening,

(b) means for biasing said lamellae in to said closed position,

(c) at least two pusher rods, each respectively connected at one of their ends to respective lever portions of said lamellae,

(d) a pivoted adjusting lever for each of said pusher rods, one end of each lever being operatively connected to the other end of its corresponding pusher rod,

(e) an electro-magnet for each adjusting lever for controlling the opposite end thereof, wherein said lamellae is moved to said open position in opposition to said biasing means upon energization of said electro-magnet, and

(f) electrical control means for energizing said electro-magnets for a predetermined time period whereby said lamellae maintain their open position during said time period.

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**4,110,765**

## LIGHT-MEASURING SYSTEMS FOR SINGLE LENS REFLEX CAMERAS

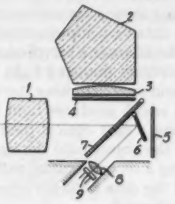
**Katsuhiko Miyata, Saitama; Fumio Urano, Omiya, and Akihiro Arai, Tokyo, all of Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Japan**

**Filed Jun. 18, 1976, Ser. No. 698,469**

**Claims priority, application Japan, Jul. 3, 1975, 50-82399**

**Int. Cl.² G03B *7/00***

**U.S. Cl. 354—59** **7 Claims**

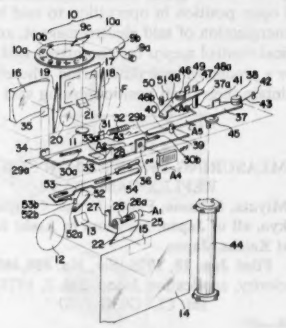


1. In a single lens reflex camera, objective means forming one of a plurality of objective means respectively having different focal lengths and adapted to be used interchangeably, said objective means having an optical axis along which light travels through said objective means into the camera, main mirror means situated behind said objective means and viewfinder means situated above said main mirror means, said main mirror means reflecting light which has traveled through said objective means to said viewfinder means, and said main mirror means having a semitransparent portion through which part of the light which has traveled through said objective means passes, auxiliary mirror means situated behind said semitransparent portion of said main mirror means for receiving the part of the light which passes through said semitransparent portion of said main mirror means, said auxiliary mirror means reflecting the light received thereby along a predetermined path, and photosensitive means situated along said path for receiving the light reflected by said auxiliary mirror means and for participating in the measurement thereof, said main mirror means having at said semitransparent portion thereof a front surface from which light is reflected to said viewfinder means and an opposed rear surface beyond which light travels to said auxiliary mirror means and said auxiliary mirror means having a reflecting surface which directs the light along said predetermined path to said photosensitive means, said rear surface of said main mirror means and said reflecting surface of said auxiliary mirror means forming a pair of surfaces one of which has the property of diffusing light, so that said photosensitive means receives diffused light, reflected from said auxiliary mirror means, for reducing the difference in the operation of said photosensitive means with respect to a plurality of objective means of different focal lengths.

## 4,110,766
## SUPERIMPOSING DEVICE FOR USE IN A DATA-RECORDING CAMERA

Susumu Fujita; Yoichi Hamada, both of Kobe, and Makoto Kuboshima, Sagamihara, all of Japan, assignors to Fuji Photo Film Co., Ltd., Minami Ashigara, Japan

Filed Nov. 17, 1977, Ser. No. 852,261
Claims priority, application Japan, Nov. 19, 1976, 51-139667
Int. Cl.[2] G03B *17/24, 13/02*
U.S. Cl. 354—106 7 Claims



1. A superimposing device for use in a data-recording camera for interposing data on a film over an image of an object and for producing said data in a viewfinder having a view-taking window for receiving therein a light image of the object and an eye-piece, said superimposing device comprising:

a source of light which produces light image of data;

means for defining a first optical path for projecting said light image of the object onto the eye-piece;

means for defining a second optical path for projecting said light image of the data onto the eye-piece at a predetermined portion thereof;

first blocking means provided adjacent said viewtaking window, means for changing the condition thereof between a blocking condition, in which said first blocking means intercepts said first optical path to block the light directed to said predetermined portion of said eye-piece and an open condition, in which said first blocking means is released from blocking said first optical path; and

first actuating means for actuating said changing means to shift said first blocking means between said blocking condition and said open condition,

whereby upon actuation of said first actuating means, said first blocking means changes from open condition to said blocking condition and said first blocking means prevents said predetermined portion of the eye-piece which is constituting a background of the data from being lighted by the light image of the object and thus the data is clearly formed in said predetermined portion of the eye-piece.

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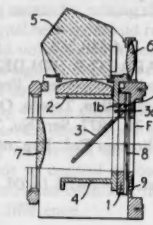
## 4,110,767
## SHUTTER AND VIEW FINDER FOR SINGLE LENSE REFLEX CAMERA

Eiichi Onda; Mitsuo Koyama; Ichiro Nemoto; Tadashi Nakagawa, and Masanori Watanabe, all of Yotsukaido Japan, assignors to Seiko Koki Kabushiki Kaisha, Japan

Filed Jan. 21, 1977, Ser. No. 760,980
Claims priority, application Japan, Jan. 22, 1976, 51/5958[U]
Int. Cl.[2] G03B *19/12*
U.S. Cl. 354—152 3 Claims

1. In a single lens reflex camera, the combination of a shutter assembly comprising a shutter base plate, a cover plate rearwardly of the shutter base plate and in front of the film plane of the camera and shutter between said shutter base plate and said cover plate, said shutter base plate being thick to provide a robust construction, a mirror box in front of said shutter base plate, a reflection mirror hingedly supported in said mirror box, an imaging plane above said mirror in conjugate relation to the film plane of the camera, a viewing lens and a prism for reflecting an image on said imaging plane to said viewing lens, the front face of said shutter base plate being recessed within the thickness of said shutter base plate, the rear face of said shutter base plate being plane, and the hinge axis of said mirror



being in the thus formed recessing and being located rearwardly of the front face of said shutter base plate and within the thickness of said shutter base plate, whereby the mirror is positioned closer to said film plane, and said imaging plane, prism and viewing lens are positioned closer to the optical axis of the camera to reduce the overall height and thickness of the camera.

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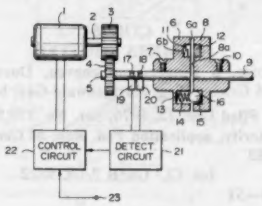
## 4,110,768
## AUTOMATIC FILM WIND UP DEVICE FOR A CAMERA

Saburo Numata, Urawa, Japan, assignor to Fuji Photo Optical Co., Ltd., Omiya, Japan

Filed Sep. 23, 1976, Ser. No. 725,734
Claims priority, application Japan, Sep. 23, 1975, 50-131143[U]
Int. Cl.[2] G03B *1/18*
U.S. Cl. 354—173 6 Claims




1. An automatic film wind up device for automatically winding a film loaded in a camera when a frame of the film has been exposed comprising:

an electric motor which is started upon completion of exposure of one frame of a film in a camera,

a drive disc connected with said electric motor to be rotated thereby,

a driven disc connected with a film wind up shaft for rotating the same when driven to rotate, the film wind up shaft being stopped when a predetermined length of film has been wound up thereby, said driven disc having an end face facing to an end face of said drive disc,

means for coupling said driven disc to said drive disc with a coupling force which is overcome by a force with which said film wind up shaft is stopped,

a position detecting means comprised of two elements one of which is mounted on the end face of said drive disc and the other of which is mounted on the end face of said driven disc at such positions that the two elements are aligned with each other only when the driven disc is in a predetermined relative position with respect to the drive disc, in said predetermined relative position said driven

disc being coupled to said drive disc by means of said coupling means, said position detecting means generating an electric signal when said two elements are moved out of alignment with each other, and

means connected with said position detecting means and said electric motor for stopping the electric motor upon receipt of said signal from the position detecting means.

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**4,110,769**

## COUPLING MECHANISM FOR THE ALTERNATE MANUAL AND AUTOMATIC ADJUSTMENT OF A VARIFOCAL OBJECTIVE

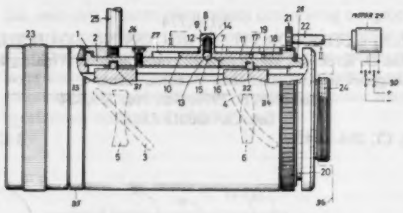
**Karl-Heinz Schütz, and Karl Tesch, both of Bad Kreuznach, Fed. Rep. of Germany, assignors to Jos. Schneider & Co. Optische Werke Kreuznach, Bad Kreuznach, Fed. Rep. of Germany**

**Filed Apr. 20, 1977, Ser. No. 789,228**

**Claims priority, application Fed. Rep. of Germany, Apr. 21, 1976, 2617464**

**Int. Cl.[2] G02B *7/10*; G03B *3/02***

**U.S. Cl. 354—195** **4 Claims**



1. In a camera provided with a varifocal objective having components shiftable along an optical axis with the aid of a camming sleeve centered on said axis,

the combination therewith of:

a control ring surrounding said sleeve, said control ring being partly separated from said sleeve by an intervening clearance and having an axially extending slot communicating with said clearance;

a slider axially displaceable in said clearance and provided with indexing means for yieldably arresting it in either of two axially spaced positions, said slider having an extension passing outwardly through said slot for manipulation by a user;

a coupling ring coaxial with said sleeve having a toothed surface confronting said slider, the latter having a toothed edge engageable with said toothed face in one of said positions but disengaged therefrom in the other of said positions; and

automatic drive means operatively connected with said coupling ring for reversibly rotating said sleeve through the intermediary of said slider in said one of said positions, said control ring being provided with handle means enabling manual rotation of said sleeve in said other of said positions.

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**4,110,770**

## SYSTEM FOR MOUNTING ACCESSORIES ON A CAMERA

**Karl-Heinz Lange, Bunde, Fed. Rep. of Germany, assignor to Balda-Werke Photographische Gerate und Kunststoff GmbH & Co. KG, Fed. Rep. of Germany**

**Filed Nov. 3, 1976, Ser. No. 738,444**

**Claims priority, application Fed. Rep. of Germany, Aug. 6, 1976, 2635370**

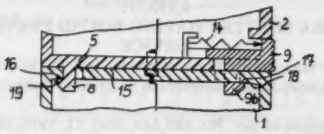
**Int. Cl.[2] G03B *17/00***

**U.S. Cl. 354—202** **15 Claims**

1. A system for mounting an accessory unit on a camera housing, which comprises:

(a) a camera housing having apertures therethrough disposed adjacent the ends of the plane of contact between the accessory unit and the camera housing, and an inner surface provided with opposed inclined surfaces leading from each aperture, and

(b) an accessory unit comprising at least one stationary hook-shaped bolt means and at least one movable hook-shaped bolt means disposed to fit into said apertures, said



bolt means having inclined faces corresponding to the inclined faces in the camera housing inner surface such that when the accessory unit is mounted on the camera housing with the bolt means in the apertures, the inclined faces of the bolt means are in contact with the inclined faces of the camera housing inner surface, and spring means urging said bolt means into contact with said inclined surfaces.

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**4,110,771**

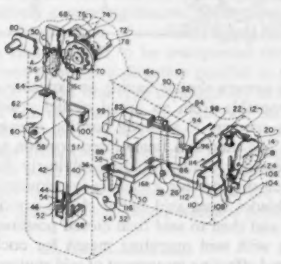
## DOUBLE EXPOSURE PREVENTION MECHANISM

**Guilford Edwin Kindig, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Mar. 22, 1977, Ser. No. 780,151**

**Int. Cl.[2] G03B *19/02***

**U.S. Cl. 354—207** **3 Claims**



1. In a photographic camera having a shutter, the combination comprising:

shutter actuating means adapted to move from a first position to a second position for opening the shutter;

body release means, biased toward a first position and movable to a second position for initiating a photographic operation, said body release means cooperating with said shutter actuating means to move said shutter actuating means to its first position in response to movement of said body release means from its second position to its first position;

film advance means releasably held in a first position and movable from said first position through an intermediate position to a second position preparatory to advancing film and movable from said second position toward said first position for advancing film, said film advance means being adapted to be released from said first position to move to said intermediate position in response to movement of said body release means to its second position and adapted to move from said intermediate position to said second position in response to movement of said body release means from its second position toward its first position; and

latch means coupled to said film advance means and cooper-

ating with said shutter actuating means for releasably retaining said shutter actuating means for releasably retaining said shutter actuating means in its first position when said film advance means is in its first position or its second position and for releasing said shutter actuating means in response to movement of said film advance means from its first position to its intermediate position.

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**4,110,772**

## CAMERA SHUTTER HAVING BOUND PREVENTION DEVICE

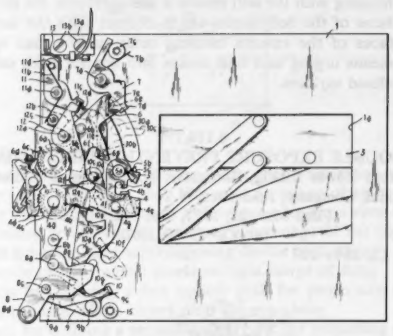
**Tadashi Nakagawa; Mitsuo Koyama, and Eiichi Onda, all of Yotsukaido, Japan, assignors to Seiko Koki Kabushiki Kaisha, Japan**

**Continuation of Ser. No. 685,443, May 11, 1976, abandoned. This application Oct. 3, 1977, Ser. No. 838,866**

**Claims priority, application Japan, May 14, 1975, 50-63772[U]**

**Int. Cl.² G03B** *9/08, 9/40*

**U.S. Cl. 354—246** **4 Claims**



1. In a camera shutter having an exposure aperture; shutter blades operable from an initial closed position closing said exposure aperture to an open position opening said exposure aperture and then to a final closed position to effect an exposure; operating means including relatively displaceable opening and closing driving members for sequentially driving said shutter blades from said initial closed position to said open position and then to said final closed position; cocking means coacting with said operating means for cocking the camera shutter and effecting movement of said shutter blades from said final closed position to said initial closed position; and rebound preventing means for preventing rebound of said shutter blades after reaching their final closed position, said rebound preventing means comprising means on said cocking means for engaging and releasably interlocking with said closing driving member during driving movement of said closing driving member to move said shutter blades to their final closed position to thereby prevent rebounding of said shutter blades.

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**4,110,773**

## BRAKE SYSTEM FOR FOCAL PLANE SHUTTERS OF PHOTOGRAPHIC CAMERAS

**Erwin Scholz, Brunswick, Fed. Rep. of Germany, assignor to Rollei-Werke Franke & Heidecke, Brunswick, Fed. Rep. of Germany**

**Filed Jul. 13, 1977, Ser. No. 815,368**

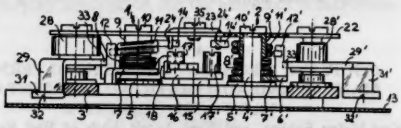
**Claims priority, application Fed. Rep. of Germany, Jul. 22, 1976, 2632944**

**Int. Cl.² G03B** *9/08*

**U.S. Cl. 354—252** **15 Claims**

1. A focal plane shutter for a photographic camera having a brake system for braking the movement of elements of said shutter, said braking system being effective during a braking portion of said movement of said elements, said braking portion occurring just before said shutter elements reach their stop positions, and said braking system being characterized by the fact that:

a. at least one first brake element having a nearly constant braking torque throughout said braking portion of said movement;



b. at least one second brake element having a braking torque that increases over said braking portion of said movement;

c. means for combining said constant and increasing braking torques of said first and second brake elements; and

d. means for adjusting and setting said constant and increasing braking torques of said first and second brake elements independently of each other.

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**4,110,774**

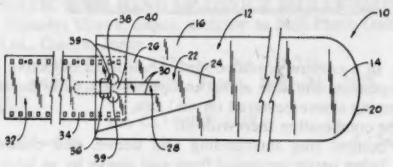
## FILM GUIDE FOR FILM PROCESSING EQUIPMENT

**Vivian D. Krehbiel, and Ralph L. Haas, both of Wichita, Kans., assignors to Kreonite, Inc., Wichita, Kans.**

**Filed Nov. 8, 1976, Ser. No. 739,434**

**Int. Cl.² G03D** *13/10*

**U.S. Cl. 354—345** **2 Claims**



1. A film guide for film processing equipment, the guide comprising:

an elongated flexible leader having a flat surface, said leader having a front portion and a rear portion;

an aperture disposed in the rear portion of said leader and therethrough;

a flat flexible keeper having a front portion and a rear portion, the front portion of said keeper attached to the top of said leader; and

an elongated tongue intergrally formed in the rear portion of said keeper by cutting a pair of parallel lines therethrough;

the end of a roll of film having an aperture therethrough is received between the rear portion of said keeper and the rear portion of said leader, the film held in place by threading said tongue through the aperture in the film and through the aperture in the rear portion of said leader.

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**4,110,775**

## SCHOTTKY DIODE WITH VOLTAGE LIMITING GUARD BAND

**Thomas A. Festa, 5250 Round Meadow Rd., Hidden Hills, Calif. 91302**

**Continuation of Ser. No. 716,427, Aug. 23, 1976, abandoned. This application Nov. 25, 1977, Ser. No. 854,848**

**Int. Cl.² H01L** *29/48*

**U.S. Cl. 357—15** **3 Claims**

1. A metal-semiconductor diode comprising:

a semiconductor body of a first conductivity type including a silicon substrate having an epitaxial layer disposed thereon;

a metal layer in contact with said epitaxial layer, said metal layer and epitaxial layer forming a metal-semiconductor barrier; and

integral circuit protection means for protecting said metal-semiconductor barrier from large reverse potentials by voltage clamping said barrier to a predetermined potential, said circuit protection means comprising a region of a second conductivity type disposed in said epitaxial layer in contact with said metal layer, said region and epitaxial layer forming a junction, the breakdown voltage of said junction being approximately equal to or lower than the breakdown voltage of said barrier.

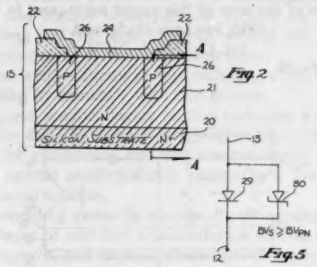

Fig. 2

Fig. 3

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**4,110,776**

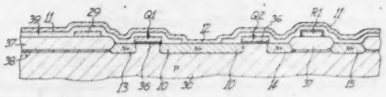
## SEMICONDUCTOR INTEGRATED CIRCUIT WITH IMPLANTED RESISTOR ELEMENT IN POLYCRYSTALLINE SILICON LAYER

**G. R. Mohan Rao; John S. Stanczak; Jih-Chang Lien, and Shyam Bhatia, all of Houston, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Sep. 27, 1976, Ser. No. 727,116**

**Int. Cl.² H01L *29/78, 27/02, 29/04***

**U.S. Cl. 357—23** **21 Claims**




1. A resistor element for an N-channel, silicon-gate MOS integrated circuit of the type having field oxide surrounding transistor areas on the face of a semiconductor substrate, the transistor areas having gate oxide much thinner than the field oxide, comprising:

a. an elongated strip of polycrystalline silicon extending across the field oxide and contacting at least one of the transistor areas,

b. a resistor region in the elongated strip implanted with conductivity determining impurity to provide a selected resistivity less than that of undoped polycrystalline silicon,

c. conductive regions in the elongated strip on both ends of the resistor regions, the conductive regions being doped at a level much higher than the resistor region.

**4,110,777**

## CHARGE-COUPLED DEVICE

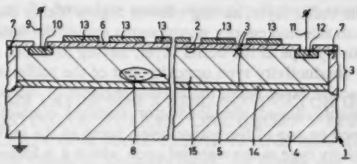
**Leonard Jan Maria Esser, and Matthias Johannes Joseph Theunissen, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Jan. 30, 1975, Ser. No. 545,408**

**Claims priority, application Netherlands, Feb. 13, 1974, 7401939**

**Int. Cl.² H01L *29/78***

**U.S. Cl. 357—24** **12 Claims**




1. A charge-coupled device having a semiconductor body portion comprising a semiconductor layer of a first type conductivity, an adjoining substrate of a second type conductivity below said semiconductor layer which forms a p-n junction with the layer, means for electrically isolating the layer from its surroundings, said layer a thickness and a doping concentration such that a depletion zone is obtainable throughout the thickness thereof by applying a suitable electric field thereto, input means for locally introducing into the semiconductor layer information in the form of charge consisting of majority charge carriers, output means spaced apart from said input means for reading out said information, electrode means above the upper surface of the layer and electrically insulated therefrom for capacitively generating electric fields in the semiconductor layer upon application of a suitable signal to said electrode means to cause charge to be transported through the layer to the output means in a direction parallel to the layer, and a buried zone of said first type conductivity in said semiconductor layer and adjoining the p-n junction between the substrate and the semiconductor layer, which buried zone extends upwardly from the p-n junction up through only a minor part of the total thickness of the semiconcuctor layer and has a higher doping concentration than the adjoining remainder of the semiconductor layer which is present above the buried zone.

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**4,110,778**

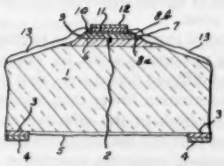
## NARROW-BAND INVERTED HOMO-HETEROJUNCTION AVALANCHE PHOTODIODE

**Richard C. Eden, Thousand Oaks, and Kenichi Nakano, N. Hollywood, both of Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Jun. 21, 1977, Ser. No. 808,496**

**Int. Cl.² H01L *27/14***

**U.S. Cl. 357—30** **3 Claims**




1. An avalanche type photodiode device comprising:

a. a semiconductor substrate transparent to a selected band

of light energy having first and second major surfaces on opposite sides thereof;

b. an electrical contact ohmically connected to the first major surface;

c. a doped semiconductor material buffer layer formed on the second surface, having the same conductivity type as the substrate, being composed of a material transparent to selected wavelengths of light energy, having a lattice structure matching a succeeding actve layer, and etched to form the lower-most segment of a mesa having the substrate as its base;

d. a semiconductor material active layer formed on the top of the buffer layer, having a lower region highly doped to absorb selected energy wavelengths and of the same conductivity type as the buffer layer, having an upper region of a conductivity type opposite that of the buffer region, the active layer being the middle segment of the mesa;

e. a highly doped semiconductor material contact layer formed on top of the active layer, being of the same conductivity type as the material upon which it is formed, the contact layer being the uppermost segment of the mesa, the mesa having smooth edges where the layers join together to form a sloped surface;

f. a passivation material deposited upon the sloped mesa surface, being of a material that induces opposite conductivity type surface channels at the lower region of the active layer; and

g. an ohmic contact connected to the contact layer.

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**4,110,779**

## HIGH FREQUENCY TRANSISTOR

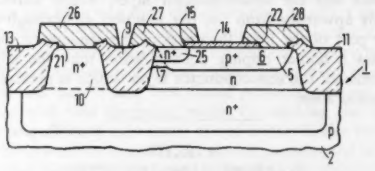
**Ronald Rathbone, Taukfirchen, and Ulrich Schwabe, Munich, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany**

**Filed Dec. 13, 1976, Ser. No. 749,609**

**Claims priority, application Fed. Rep. of Germany, Feb. 12, 1976, 2605641**

**Int. Cl.[2] H01L *29/72***

**U.S. Cl. 357—34** **6 Claims**




1. A high-frequency transistor structure adapted for providing a small effective emitter width and a low base bulk resistance, comprising:

a semiconductor body of first conductivity type;

a collector zone of second conductivity type formed on the semiconductor body;

a base zone of first conductivity type above the collector zone;

an emitter zone of second conductivity type above a portion of the base zone;

insulating material to one side of the emitter and base zones;

said base zone comprising a first ion implanted doped zone and a second diffused doped zone, said first zone having a doping concentration lower than said second zone, said first zone establishing the effective emitter width and being formed between the emitter and collector zones and also between said insulating material on one side and the base second zone on the entire opposite side; and

said emitter zone overlies and is in contact with the base first zone and overlies and is in contact with a portion of the base second zone.

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## SEMICONDUCTOR POWER COMPONENT

**Jozef Cornu, Stekene, Belgium, and Erich Weisshaar, Baden, Switzerland, assignors to BBC Brown Boveri & Company, Limited, Baden, Switzerland**

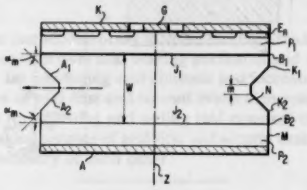
**Continuation of Ser. No. 483,813, Jun. 27, 1974, Pat. No. 3,987,479. This application Apr. 8, 1976, Ser. No. 675,143**

**Claims priority, application Switzerland, Jul. 6, 1973, 9867/73**

**The portion of the term of this patent subsequent to Oct. 19, 1993, has been disclaimed.**

**Int. Cl.[2] H01L *29/74***

**U.S. Cl. 357—38** **6 Claims**




1. A semiconductor power element comprising two successive opposed polarity planar pn junctions, the element being positively tapered on its lateral surface in the regions of both pn junctions to form an average angle of both tapers of between 30° and 60°, the pn junctions appearing on the lateral surface of the semiconductor element outside of the tapers wherein the doping of the zone between the two pn junctions is lower than $3.5 \times 10^{13} cm^{-3}$ and its thickness is equal to the thickness of the space charge region found in it at maximal voltage-blocking plus at least two minority carrier diffusion lengths and wherein the circumferential groove formed by the two tapers forms angles of inclination with respect to the pn junctions between 40° and 45° with the bottom of the groove being longer than 40 μm.

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**4,110,781**

## BIDIRECTIONAL GROOVED THYRISTOR FIRED BY ACTIVATION OF THE BEVELED SURFACES

**Nobutake Konishi; Takeshi Yokota; Yoshitaka Sugawara; Tsutomu Yatsuo, and Masahiro Okamura, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan**

**Filed Oct. 5, 1976, Ser. No. 730,183**

**Claims priority, application Japan, Oct. 11, 1975, 50-121859**

**Int. Cl.[2] H01L *29/747***

**U.S. Cl. 357—39** **21 Claims**

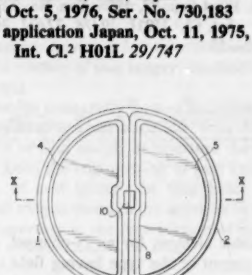
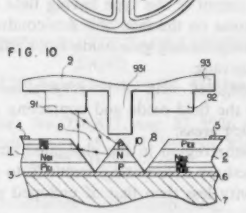



FIG. 10




5. A bidirectional light-activated thyristor comprising:

a first semiconductor section including four contiguous

PNPN layers of alternately opposite conductivites arranged so as to form a PN junction between each adjacent one of said layers,

a second semiconductor section including four contiguous PNPN layers of alternately opposite conductivities arranged so as to form a PN junction between each adjacent one of said layers,

a groove formed between said first semiconductor section and said second semiconductor section for electrically isolating said first semiconductor section and said second semiconductor section from each other,

said first semiconductor section including a first end surface defining its boundary with said groove,

said second semiconductor section including a second end surface defining its boundary with said groove,

means for maintaining said first semiconductor section and said second semiconductor section in a predetermined positional relation,

first connecting means for electrically connecting an N-type end layer of said first semiconductor section to a P-type end layer of said second semiconductor section,

second connecting means for electrically connecting a P-type end layer of said first semiconductor section to an N-type end layer of said second semiconductor section,

first trigger means for applying a light signal to a light-receiving end surface of said first semiconductor section for triggering said first semiconductor section,

second trigger means for applying a light signal to a light-receiving end surface of said second semiconductor section for triggering said second semiconductor section,

means for blocking the passage of a light signal from said first trigger means to said second semiconductor section and the passage of a light signal from said second trigger means to said first semiconductor section, and

an island member formed on the bottom of said groove, said island member acting as said light signal-blocking means.

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**4,110,782**

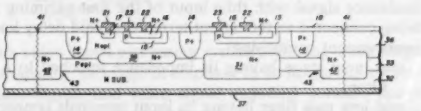
## MONOLITHIC INTEGRATED CIRCUIT TRANSISTOR HAVING VERY LOW COLLECTOR RESISTANCE

**Carl T. Nelson, Sunnyvale, and Brian E. Hollins, Los Altos, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.**

**Division of Ser. No. 600,814, Jul. 31, 1975, Pat. No. 4,046,605, and a continuation-in-part of Ser. No. 432,853, Jan. 14, 1974, abandoned. This application Apr. 21, 1977, Ser. No. 789,394**

**Int. Cl.[2] H01L** *27/04*

**U.S. Cl. 357—48** **4 Claims**



1. A monolithic circuit structure including a low collector resistance transistor, said structure comprising:

a substrate of a first conductivity type material,

a first layer of a second conductivity type material on said substrate,

a second layer of said first conductivity type material on said first layer,

a subsurface region of said first conductivity type material extending down from within the lower portion of said second layer and through said first layer into said substrate,

a base region of said second conductivity type material in said second layer over said subsurface region,

an emitter region of said first conductivity type material in said base region,

an emitter contact contacting said emitter region,

a base contact contacting said base region,

a collector contact contacting said substrate, and

a frame-shaped region of said first conductivity type material disposed in and extending vertically through said first layer of second conductivity type material on said substrate, said frame-shaped layer region extending around the periphery of an integrated circuit in said monolithic circuit structure in vertical registration with a predetermined boundary line to be used for separating the individual integrated circuit chips one from the other in the wafer in which they are formed such that upon separating the individual integrated circuit chips along said boundary lines the boundary passes vertically through said framed-shaped region.

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**4,110,783**

## SOLDER LAYER FOR A SEMI-CONDUCTOR DEVICE CONSISTING OF AT LEAST ONE GROUP V ELEMENT, AT LEAST ONE RARE ELEMENT AND ALUMINUM

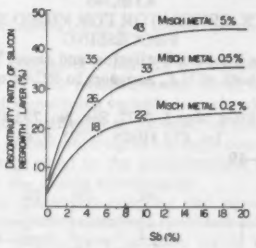
**Hisakichi Onodera; Masateru Suwa; Jin Onuki, and Yoshiteru Shimizu, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan**

**Filed Feb. 7, 1977, Ser. No. 766,503**

**Claims priority, application Japan, Feb. 9, 1976, 51-12320**

**Int. Cl.[2] H01L** *23/48, 29/46, 29/62*

**U.S. Cl. 357—67** **4 Claims**




1. A semi-conductor device, which comprises a silicon body having an exposed surface of N-type conductivity layer, and a substrate bonded to the exposed surface by means of a layer of solder material, the solder material being an alloy consisting essentially of 2 to 12% by weight of at least one element of Group V of the periodic table, 0.01 to 5% of at least one of rare earth elements and aluminum being balance.

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**4,110,784**

## NOISE REDUCTION APPARATUS

**John Gordon Amery, Quincy, Ill., and Thomas William Burrus, Indianapolis, Ind., assignors to RCA Corporation, New York, N.Y.**

**Filed Aug. 30, 1976, Ser. No. 718,804**

**Int. Cl.[2] H04N** *5/14, 5/78, 9/535;* **H04B** *15/00*

**U.S. Cl. 358—8** **7 Claims**

1. Noise reduction apparatus, for use with a source of signals, said signals being subject to occupancy of a given band of frequencies and undesirably subject to accompaniment by noise; said apparatus comprising:

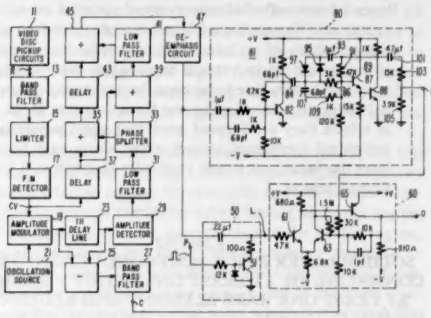
means, coupled to the output of said source of signals, for selectively passing signal components of said signal falling within a band of frequencies restricted to a high frequency portion of said given band;

means, having an input terminal coupled to the output of said selective signal passing means, and having an output terminal, for amplifying and inverting the phase of signals applied to said input terminal;

a signal path coupling said output terminal to said input terminal of said signal amplifying means;

means, interposed in said signal path, for permitting negative

feedback via said signal path only during amplitude excursions of the output signal of said amplifying means which exceed selected limits; and



combining means, coupled to said source of signals and to the output terminal of said signal amplifying means, for subtracting the output of said signal amplifying means from the output of said source of signals.

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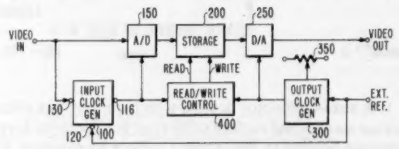
**4,110,785**

## CLOCK GENERATOR FOR VIDEO SIGNAL PROCESSING

**Robert Adams Dischert, Burlington, and James Morgan Walter, Columbus, both of N.J., assignors to RCA Corporation, New York, N.Y.**

**Filed May 3, 1977, Ser. No. 793,412**
**Int. Cl.[2] H04N 5/795, 9/46**
**U.S. Cl. 358—19** **5 Claims**



1. A signal processing system for generating a clock signal synchronized to a video signal containing at least a subcarrier burst signal component, comprising:

means for separating said subcarrier burst signal from said video signal;

a source of external reference signals at the subcarrier frequency;

first and second demodulating means coupled to said separating means and to said reference signals for demodulating said burst signal to provide quadrature control signals indicative of said burst signal phasing relative to said reference signals;

first and second modulating means responsive to said quadrature control signals and to said source of reference signals for rephasing said source of reference signals relative to the burst phasing of said video signal; and

means responsive to said rephased reference signals for generating said synchronized clock signal.

5. A signal processing system for removing time base errors from video information signals in which incoming video signals having synchronizing, subcarrier burst and image information signal components are sampled and read into memory storage means by clocking signals established by an input clock generator having a variable rate dependent on said time base errors, said stored video information being read out of said memory storage means at a constant clocking rate established by an output clock locked to an external subcarrier reference wherein said input clock generator comprises:

means for separating said subcarrier burst signal from said video signal;

first and second demodulating means coupled to said separating means and to said external reference signals for demodulating said burst signal to provide quadrature control signals indicative of said burst signal phasing relative to said external reference signals;

first and second modulating means responsive to said quadrature control signals and to said source of external reference signals for rephasing said source of external reference signals relative to the burst phasing of said video signal; and

means responsive to said rephased reference signals for generating said synchronized clock signal.

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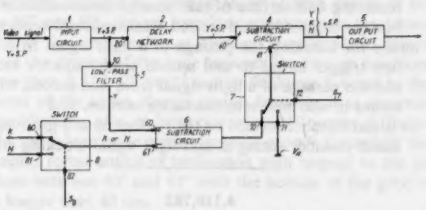
**4,110,786**

## DEVICE GENERATING SPECIAL EFFECTS ON COLOR TELEVISION PICTURES

**Lucien F. Mignot, St-Mande, and Guy R. Macheboeuf, Vintry-sur-Seine, both of France, assignors to Telediffusion de France, Montrouge, France**

**Filed Mar. 21, 1977, Ser. No. 779,552**
**Claims priority, application France, Mar. 26, 1976, 76 08796**
**Int. Cl.[2] H04N 9/535**
**U.S. Cl. 358—22** **5 Claims**



1. In a device for generating black and white titles on color television pictures transmitted by the SECAM type system using a composite video signal made up of a luminance signal and a chrominance signal in which an input stage, a delay network and a single low pass filter with input and output terminals are placed in the main video channel to delay the input video signal for a time duration depending upon the filtering characteristics of the low pass filter, said input stage, delay network and low pass filter being connected to a first summing means and a phase inverter for inverting by 180° the luminance signal with thhe input of the first summing means being connected to the output terminal of said delay line, that improvement comprising:

said input stage having its impedance matched to a single filter;

said low pass filter having its input terminals connected to the output terminals of said input stage and subtracting a constant amount from said luminance signal;

said inpedance matched input stage, delay network and filter providing an output signal from said low pass filter which is approximately the same in magnitude as the luminance signal of the chrominance subcarrier without requiring any modification of the composite input signal;

said first summing means having a first input terminal connected to the output terminal of said delay network;

a second summing means having a first input terminal which is supplied with a predetermined reference luminance signal at a reference voltage;

said second summing means having a second input terminal connected to the output terminal of said low pass filter;

a first switching means controlled by a predetermined switching signal having a first input terminal connected to the output terminal of said second summing means;

a source of reference voltage for said second summing means adjusted for cut off of said second input terminal connected to said reference voltage;

selecting means for selecting said reference voltage under the control of said predetermined switching signal;

said predetermined switching signal being emmitted from a titled picture under conditions where said predetermined luminance signal is a direct signal and said first summing means transmits said colored picture titled with said predetermined luminance;

a second switching means connected to said first input terminal of said second summing means; and

said first summing means having a second input terminal connected to the output terminal of said first switching means and its output terminal transmitting said video signal corresponding to said color pictures wherein part of said picture is made up by color pictures having said predetermined luminance.

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**4,110,787**

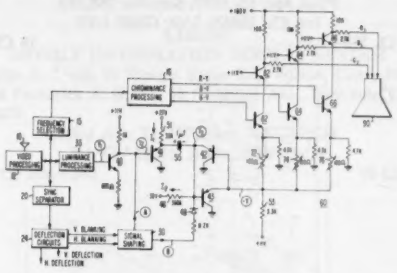
## COMBINED BLANKING LEVEL AND KINESCOPE BIAS CLAMP FOR A TELEVISION SIGNAL PROCESSING SYSTEM

**Robert Preston Parker, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.**

**Filed Jul. 28, 1977, Ser. No. 819,935**

**Int. Cl.[2] H04N** *9/535, 9/18, 5/18*

**U.S. Cl. 358—34** **17 Claims**



1. In a video signal processing system including a kinescope for reproducing an image in response to an image representative video signal, said video signal including periodic image blanking intervals disposed between periodic image intervals containing image information signals, said blanking intervals containing a sync pulse superimposed on a pedestal blanking level during a sync interval, apparatus comprising:

means for clamping said video signal to a reference voltage during said blanking intervals;

means, having a threshold conduction level different from said reference voltage, for coupling said clamped video signal to said kinescope when said threshold level is exceeded;

means for providing periodic blanking reference pulses coincident with said blanking intervals, said reference pulses being of a magnitude substantially equal to the difference between said reference voltage and said threshold conduction level of said coupling means; and

means for combining said reference pulses with said video signal prior to clamping.

**4,110,788**

## MULTIPLE WAVELENGTH ACOUSTOOPTIC DEFLECTION

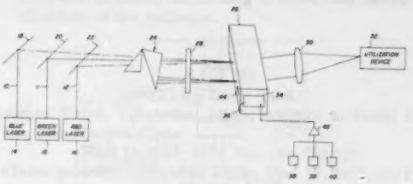
**J. Bradford Merry, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Continuation of Ser. No. 670,771, Mar. 26, 1976, abandoned.**

**This application Feb. 22, 1977, Ser. No. 785,281**

**Int. Cl.[2] H04N** *9/14;* **G02F** *1/24*

**U.S. Cl. 358—63** **7 Claims**



1. Acoustooptic apparatus for deflecting a plurality of separate monochromatic beams of differing wavelengths through a predetermined angular range, said apparatus comprising:

(a) an acoustoopic diffraction cell which exhibits an anisotropic mode of diffraction wherein the angle-of-incidence versus acoustic frequency characteristic exhibits an inflection point, for each of said wavelengths, repsectively, at a different, predetermined incidence angle and acoustic frequency;

(b) electromechanical transducer means operatively coupled to said cell;

(c) means for generating a plurality of periodic signals, one such signal for each monochromatic beam, the frequency of each such signal being variable over a bandwidth which is outside the bandwidth of the other of said signals, the bandwidth of each such signal having a center frequency approximately equal to the predetermined acoustic frequency for one of said wavelengths;

(d) means for operatively coupling said signal generating means to said transducer means to vibrate said transducer means and thereby cause acoustic waves to propagate through said cell, said acoustic waves having frequency components proportional the respective frequencies of said periodic signals; and

(e) means for directing said plurality of monochromatic beams at said cell in a manner such that each beam is incident at its predetermined incidence angle with respect to a plane normal to the direction of acoustic wave propagation.

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**4,110,789**

## PROCESS AND APPARATUS FOR THE EXACT DETERMINATION OF THE PERIODIC POSITION OF A TELEVISION VERTICAL SYNCHRONIZING SIGNAL

**Hans-Peter Maly, Darmstadt, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany**

**Filed Jan. 31, 1977, Ser. No. 764,071**

**Claims priority, application Fed. Rep. of Germany, Feb. 2, 1976, 2604523**

**Int. Cl.[2] H04N** *5/04*

**U.S. Cl. 358—148** **6 Claims**

1. A method for exact determination of the periodic position of the vertical component of a television synchronizing signal by using the expression:

$$\Delta N_v = n_R + \frac{1}{k} \sum_{i=1}^{k-1} i(n_R - \Delta n_i)$$

wherein

$\Delta N_V$ = the number of periods of a reference signal ($f_{Ref}$) counted from the $k-1$ negative synchronizing pulse edge after the characteristic pulse is generated until the position of the vertical component,

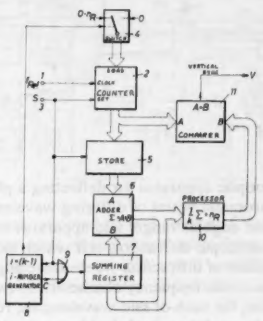
$n_R$ = the number of periods of the reference signal during the time interval between two successive synchronizing pulses,

$k$ = the number of negative synchronizing pulse edges which are brought up for evaluation,

$i$ = functional variable, $i = 1, 2, \ldots, k-1$, and

$\Delta n_i$ = the number of periods of the reference signal in the time interval from the $i-1$ to the $i$-th negative synchronizing pulse edge,

comprising the steps of:




A. counting the period of the reference signal with a counter for determining in the time interval the frequency of the two synchronizing pulses relative to the number of correct preset periods of the reference signal in the same time interval,

B. storing the value of the period number thus determined in a storage unit for the duration of the time interval of the two synchronizing pulses,

C. providing said value to an addition unit to sum up the corresponding $i$ periodic numbers after the functional variable $i$ has gone $i$ times, the output value at an output terminal of the addition unit being

$$\sum_{i=1}^{k-1} i(n_R - \Delta n_i)$$

D. dividing said output in a subsequent processing stage by the number $k$ of evaluated time intervals between the synchronizing pulses and increasing the quotient by the number $n_R$ of correct preset periods of the reference signal in a time interval between two synchronizing pulses, and

E. comparing the value obtainable at the outlet of the processing unit, which is

$$\Delta N_v = n_R + \frac{1}{k} \sum_{i=1}^{k-1} i(n_R - \Delta n_i)$$

in a comparer with the value at the outlet of the counter (which is loaded at the time $k-1$ with a value of zero) to derive the time position of a characteristic pulse of the vertical sync component by means of comparison.

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**4,110,790**

## VIDEO PROCESSING SYSTEM PROVIDING GAIN CONTROL, APERTURE CONTROL, AND BLACK LEVEL CONTROL

**Robert C. Wheeler, Elba, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.**

**Filed Jan. 19, 1977, Ser. No. 760,284**

**Int. Cl.² H04N** *5/14, 5/18, 5/52*

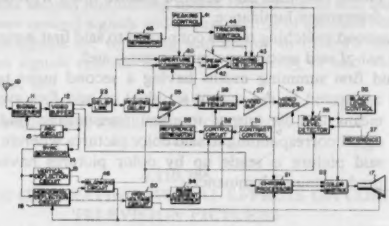
**U.S. Cl. 358—162** **15 Claims**

7. A video processing system for a television receiver comprising:

a video amplifier for amplifying a video signal having video intervals and blanking intervals, said blanking intervals having a signal level corresponding to the black level of the video intervals;

a blanking circuit for providing blanking pulses during said blanking intervals of said video signal;

comparing means connected to receive a reference voltage and a portion of the video signal from said video amplifier, and further connected to a control input of said video



amplifier for providing a black level control signal to said control input in response to the relative amplitudes of said reference voltage and said portion of the video signal; and

means connecting said blanking circuit to said comparing means for disabling said comparing means during said blanking intervals except for residual portions of said blanking intervals, said comparing means averaging said residual portions of said blanking intervals with video signals occurring during said video intervals.

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**4,110,791**

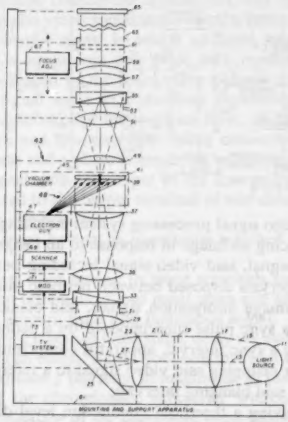
## TELEVISION PROJECTOR SYSTEM

**Gottfried R. Rosendahl, Winter Park, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Apr. 18, 1977, Ser. No. 788,383**

**Int. Cl.² H04N** *5/66;* **G02F** *1/01*

**U.S. Cl. 358—233** **18 Claims**



1. A television projection system having a plurality of optical elements disposed along a predetermined optical path for projecting an image onto a reflective screen, comprising in combination:

a light relay image generator disposed on a predetermined optical path;

a first field lens spatially disposed upstream from said light relay image generator on said predetermined optical path;

a second field lens spatially disposed downstream from said

light relay image generator on said predetermined optical path;

a first Wollaston prism spatially disposed upstream from first field lens on said predetermined optical path;

a pair of condenser lenses respectively spatially disposed from but adjacent to the opposite sides of said first Wollaston prism on said predetermined optical path;

a second Wollaston prism spatially disposed downstream from said second field lens on said predetermined optical path;

a pair of projector lenses respectively spatially disposed from but adjacent to opposite sides of said second Wollaston prism on said predetermined optical path;

a first predetermined light polarizer disposed downstream from said pair of projector lenses on said predetermined optical path;

a radiant energy source located upstream of the aforesaid pair of condenser lenses on said predetermined optical path;

means including a second predetermined light polarizer located on said predetermined optical path between said radiant energy source and the upstream projector lens of the aforesaid pair of projector lenses for the illumination thereof thereby and, thus, causing predetermined portions of the radiant energy from said radiant energy source to be projected downstream along the entire length of said predetermined optical path;

a viewing screen disposed downstream of the downstream lens of the aforesaid pair of projector lenses on said predetermined optical path; and

means effectively connected to the downstream lens of the aforesaid pair of projector lenses for effecting the adjustment thereof in such manner that the radiant energy projected downstream from said radiant energy source is focused on said viewing screen after passing through each of the aforesaid optical elements, including any image generated by the aforesaid light relay image generator.

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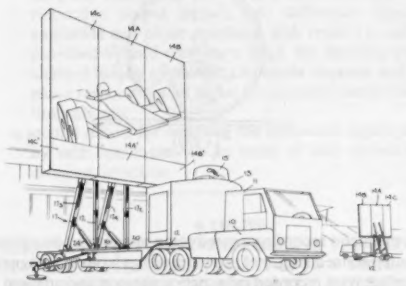
**4,110,792**

## MOBILE INFORMATION DISPLAY SYSTEM

**Douglas A. Long, 94 Sturgis Ridge Rd., Wilton, Conn. 06897, and Frederick A. Burke, 40 Riverside Ave., Riverside, Conn. 06878**

**Filed Apr. 22, 1977, Ser. No. 789,833**
**Int. Cl.[2] H04N *3/12*; G08B *23/00***
**U.S. Cl. 358—240** **10 Claims**



1. A mobile information display system transportable to the site of an event to afford a large screen display of video images derived from a live camera so that the audience may be presented with an enlarged view of the activity, said system comprising:

(A) a lamp matrix screen board having an array of individually-controllable lamps, said board being sectioned into a central panel and a pair of side wings hinged thereto which are foldable thereover to form a compact stack;

(B) a computer responsive to signals derived from said live camera and coupled to said lamps to cause said matrix to produce black-and-white images of said activity; and

(C) transport means for carrying said stack and said computer to said site, said transport means including a turntable and a lifting assembly thereon coupled to the rear of said center panel and adapted to raise said stack from a horizontal position to vertical viewing position at which said wings may be unfolded to render said screen effective, said turntable functioning to orient said screen in the direction of the audience.

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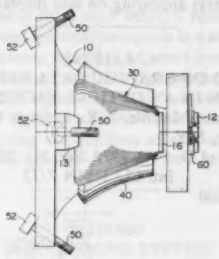
**4,110,793**

## DEFLECTION YOKE

**Atsufumi Tajiri, Yokohama, Japan, assignor to Denki Onkyo Co., Ltd., Tokyo, Japan**

**Filed Dec. 17, 1976, Ser. No. 751,729**
**Claims priority, application Japan, Dec. 17, 1975, 50/171174**
**Int. Cl.[2] H04N *5/64***
**U.S. Cl. 358—248** **7 Claims**




1. A deflection yoke comprising a horizontal deflection coil of a saddle configuration, a vertical deflection coil having an annular core carrying a toroidal winding thereon, a coil separator interposed between the deflection coils and having a plurality of tongues formed at the rear end thereof, the tongues being adapted to surround a neck of a cathode ray tube, a band for clamping the tongues against the neck, at least three threaded bores formed in a front portion of the coil separator at a given interval about the axis of the deflection yoke and extending in a direction toward the wall of the cathode ray tube, and adjusting bolt means having a threaded portion threadably engaging the threaded bores and a head portion directly contacting the tube, the bolt means being turned to adjust the inclination of the deflection yoke with respect to the cathode ray tube.

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**4,110,794**

## ELECTRONIC TYPEWRITER USING A SOLID STATE DISPLAY TO PRINT

**Robert W. Lester, Manhasset, and Robert Hotto, New York, both of N.Y., assignors to Static Systems Corporation, New York, N.Y.**

**Filed Feb. 3, 1977, Ser. No. 765,339**
**Int. Cl.[2] B41B *19/00*; H04N *1/00***
**U.S. Cl. 358—256** **18 Claims**

1. A word processing system for displaying and reproducing alphanumeric characters comprising:

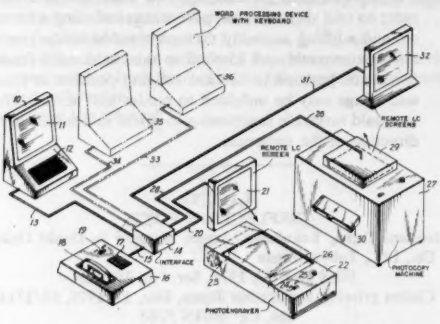
a housing including an electronic keyboard with keys representing individual alphanumeric characters;

at least one solid state reflective display for

logic means connected to said keyboard and solid state reflective display for scanning said keyboard upon the depression of one or more keys;

solid state memory means having stored coded character information and coupled to said logic means for sequencing said logic means for each of the keyed characters depressed and for generating a displayed character on said

solid state display screen responsive to the character keyed; and




print means coupled to said solid state display for reprinting the characters appearing on said display.

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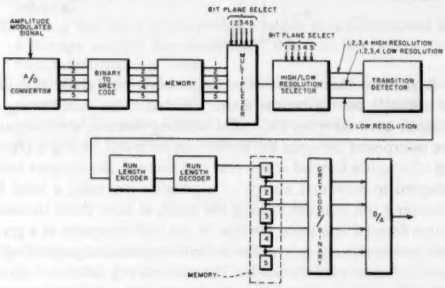
**4,110,795**

## METHOD OF GRAPHIC DATA REDUNDANCY REDUCTION IN AN OPTICAL FACSIMILE SYSTEM

**David R. Spencer, Melville, N.Y., assignor to Litton Systems, Inc., Melville, N.Y.**

**Filed Dec. 20, 1976, Ser. No. 752,331**
**Int. Cl.[2] H04N 7/12**
**U.S. Cl. 358—260** **8 Claims**




1. A method of graphic data redundancy reduction in an optical facsimile system wherein picture elements are optically represented by a grey coded number having N digits where N is at least 5 comprising

evaluating at least the first N−2 bit planes to determine whether these bit planes should be processed in high or low resolution, and

arbitrarily processing the remaining at least one bit plane at low resolution.

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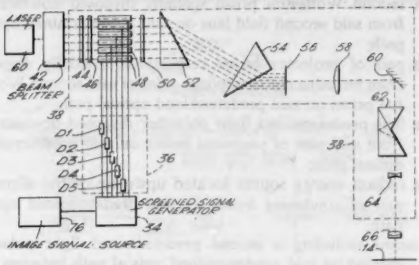
**4,110,796**

## HALF-TONE IMAGE RECORDING SYSTEM

**John E. Aughton, London, England, assignor to Crosfield Electronics Limited, London, England**

**Filed Mar. 1, 1977, Ser. No. 773,193**
**Claims priority, application United Kingdom, Mar. 3, 1976, 8518/76**
**Int. Cl.[2] H04N 1/24**
**U.S. Cl. 358—298** **6 Claims**

1. A half-tone image recording system comprising: means for generating a number of separate beams of radiation which, in cross section, form a line of spaced beams; a support for a recording surface to be treated by exposure to the beams of radiation; means producing relative movement of the recording surface on the one hand and the beams on the other hand, whereby the recording surface is scanned by the beams; modulating means for individually modulating the beams incident at points on the recording surface in accordance with the image density to be reproduced and with the screen density variations required to produce a half tone image, the modulation being such that some or all of the modulated beams contribute




towards a recording of a single half-tone image dot; and, positioned in the beam path, means for rotating the line of beams about an axis parallel to their direction of travel to alter the angle of the line of beams incident on the recording surface relative to the direction of beam scanning over the recording surface.

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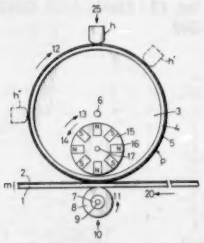
**4,110,797**

## MAGNETIC RECORDING REPRODUCING APPARATUS WITH FIELD GENERATING MEANS WITHIN THE COPY MEDIUM

**Yasushi Hoshino, c/o Tokyo Jiki Insatsu Kabushiki Kaisha 5-1, Taito 1-chome, Taito-ku, Tokyo, Japan, and Mamoru Namikawa, Machida, Japan, assignors to Tokyo Jiki InsatsuKabushiki Kaisha and Yasushi Hoshino, both of Tokyo, Japan, part interest to each**

**Filed Apr. 19, 1977, Ser. No. 788,709**
**Claims priority, application Japan, Apr. 23, 1976, 51-45409**
**Int. Cl.[2] G11B 5/86**
**U.S. Cl. 360—17** **10 Claims**



1. A magnetic recording reproducing apparatus comprising:

a predetermined length of master medium having a magnetic surface with recorded information thereon and adapted to be inserted in the apparatus;

an endless copy medium having a magnetic surface for temporarily storing the recorded informations from said master medium;

guide means for bringing the master medium and the copy medium into contact at their magnetic surfaces;

field generating means positioned within said copy medium for applying at the contact area an alternate magnetic transfer field, said field generating means consisting essentially of an arrangement of alternate N and S pole pieces of

at least one permanent or DC magnet which is mechanically oscillated or rotated;

means for selectively moving said field generating means into a first position capable of applying the magnetic transfer field to the area of contact upon insertion of said master medium into the apparatus whereby said recorded information is transferred to said copy medium and for moving said field generating means from said first position to a second position at which recorded information is not transferred to said copy medium; and

reproducing head means for repeatedly reading out the temporarily recorded informations of the copy medium.

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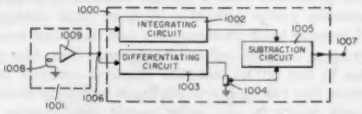
## 4,110,798
## FREQUENCY RESPONSE EQUALIZER

**Jerry W. Miller, Menlo Park, and Luigi C. Gallo, Redwood City, both of Calif., assignors to Ampex Corporation, Redwood City, Calif.**

**Filed Jan. 26, 1977, Ser. No. 762,902**
**Int. Cl.[2] G11B *5/45***
**U.S. Cl. 360—65** **8 Claims**




1. A frequency response equalization circuit in an apparatus having a circuit for axis crossing detection of signals transmitted through a digital magnetic recording/reproducing channel, said channel having a non-constant amplitude response and a non-linear phase response, where the signal provided by a magnetic reproduce head is a time differential of the recorded flux, comprising:

a parallel combination of a low-pass integrating circuit and of a high-pass differentiating circuit, both said circuits having inputs coupled to an output of said magnetic reproduce head, each said circuit having respective outputs providing output signals having respective phase shifts of substantially 90°, equal in magnitude and opposite in sense with respect to said signal provided by said reproduce head;

a first means having respective inputs coupled to respective outputs of said integrating circuit and differentiating circuit, said first means providing a difference signal of said respective output signals, said difference signal being amplitude and phase equalized with respect to said signal provided by said reproduce head, the resulting equalized channel having a constant amplitude response and a linear phase response for all signal frequencies transmitted therethrough; and

a second means for coupling the difference signal provided by said first means to an input of said circuit for axis crossing detection.

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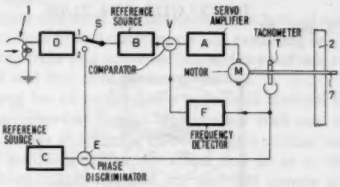
## 4,110,799
## SERVO SYSTEM FOR CONTROLLING THE POSITION OF A MAGNETIC HEAD RELATIVE TO A TRACK TO BE FOLLOWED USING PERIODICALLY INTERRUPTED LONG-WAVE POSITIONING SIGNALS

**Hendrik Jan Bergmans, Eindhoven, Netherlands, and Rudolf Drabek, Vienna, Austria, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Jan. 13, 1977, Ser. No. 759,103**
**Claims priority, application Netherlands, Jan. 17, 1976, 7600470**
**Int. Cl.[2] G11B *5/00***
**U.S. Cl. 360—70** **5 Claims**

1. A servo system for controlling the position of a magnetic reading head, comprising means for writing information signals and periodically interrupted long-wave track sensing signals coinciding with said information signals along the same track in a plurality of juxtaposed tracks, the interrupted portion of each long-wave track sensing signal in any given track being adjacent uninterrupted portions of said long-wave track sensing signals in adjacent tracks, the wavelength of the track sensing signals being at least of the same magnitude as the distance between adjacent tracks, said track sensing signals




being distinguishable from each other, a reading head means for reading both said information signals in a selected track and said long-wave sensing signals in adjacent tracks as a composite signal, circuit means for separating said track sensing signals and said information signal from said composite signal and for deriving a servo signal from said track sensing signals, and means for correcting the position of said magnetic reading head in response to said servo signal.

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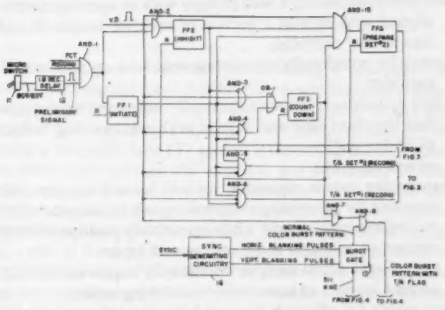
## 4,110,800
## TURNAROUND SYSTEM

**Gerhard Rotter, Mission Viejo, and Harold Ernest Arns, Chino, both of Calif., assignors to BASF Aktiengesellschaft, Ludwigshafen am Rhein, Fed. Rep. of Germany**

**Filed Oct. 1, 1976, Ser. No. 728,549**
**Int. Cl.[2] G11B *15/48***
**U.S. Cl. 360—74** **15 Claims**




1. In a color video tape recording and playback system, a turnaround control method

comprising in the recording mode:

recording, during at least a part of each horizontal blanking interval, a color burst having a frequency which is only a fraction of the white frequency of the modulated video signal, and

recording said color burst frequency during at least one predetermined vertical blanking interval at turnaround time to provide a turnaround control signal; and

comprising in the playback mode:

detecting said recorded turnaround control signal and

initiating a tape reversal operation at least partially under the control of the detection of said signal.

**4,110,801**

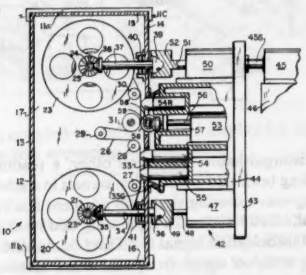
## MAGNETIC TAPE TRANSDUCING APPARATUS

**Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840**

**Continuation of Ser. No. 474,974, May 31, 1974, abandoned, which is a continuation-in-part of Ser. No. 295,807, Oct. 10, 1972, Pat. No. 3,881,053, which is a continuation-in-part of Ser. No. 224,131, Feb. 7, 1972, Pat. No. 3,699,266, which is a continuation-in-part of Ser. No. 142,748, Aug. 28, 1961, Pat. No. 3,646,258, which is a division of Ser. No. 515,417, Jun. 14, 1955, Pat. No. 3,003,109. This application Dec. 2, 1977, Ser. No. 856,914**

**Int. Cl.[2] G11B *5/54, 23/08***

**U.S. Cl. 360—96** **15 Claims**



1. A tape transport apparatus comprising in combination:
a cartridge containing record tape,
a first support,
means for receiving and predeterminately locating said cartridge on said first support,
said cartridge having a supply means for flexible record tape containing information recorded along its length and a take-up reel for receiving and winding tape fed thereto from said supply means,
means for guiding said tape in a predetermined path in said cartridge which path defines a free length of said tape within said cartridge,
said cartridge having a wall portion with an opening therein aligned with at least a portion of said free length of said tape in said cartridge,
means for rotationally supporting said take-up reel in said cartridge,
a first cylindrical member rotationally supported behind said free length of tape and aligned with said opening in said cartridge wall,
a second support,
transducing means supported by said second support and operable for generating electrical signals representative of recordings on said tape when operatively positioned with respect to said tape and scanning said tape,
a second cylindrical member rotationally supported on said second support adjacent said transducing means,
first means for effecting first predetermined relative movement between said second support and said first support in a first direction when said cartridge is predeterminately located on said first support to first cause said end wall of said cartridge containing said opening to be aligned with said transducing means, and
second means for effecting further relative movement between said cartridge and said transducing means in a second direction to bring said transducing means and cartridge into operative relation wherein that portion of said tape aligned with said opening in said cartridge wall will be operatively disposed with respect to said second cylindrical member for engaging said tape against said first cylindrical member,
motor means operable for power rotating one of said first and second cylindrical members while said tape is engaged therebetween to drive said tape towards said take-up reel,
drive means for said take-up reel,
coupling means connected to said take-up reel drive means for connecting said drive means to drive said reel,
means for effecting relative movement between at least part of said coupling means and a cartridge when said cartridge is predeterminately disposed on said first support to cause said coupling means to become operatively engaged for driving said take-up reel, and
third means for simultaneously operating said motor means to effect the driving movement of said tape and said take-up reel drive means to rotate said take-up reel and to thereby operate for taking up tape fed thereto.

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**4,110,802**

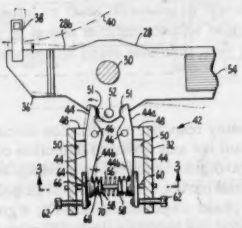
## CRASH STOP FOR DISC DRIVE ACTUATOR

**Bin-Lun Ho, and Geoffrey M. Lee, both of Los Gatos, Calif., assignors to Memorex Corporation, Santa Clara, Calif.**

**Filed May 26, 1977, Ser. No. 800,717**

**Int. Cl.[2] G11B *21/08;* G05G *1/04***

**U.S. Cl. 360—106** **10 Claims**



1. In a disc file having an accessing mechanism including an actuator having a reciprocal movable member with connected recording heads for accessing the surface of a magnetic disc, a crash stop for restraining the reciprocal displacement of the moving member of the actuator comprising:
a contact element mounted on the movable member of the actuator and movable in a generally reciprocal course with the movable member;
contact means having first and second opposed contact faces;
pivot means mounted to a stationary structure in said disc file for pivotally mounting said contact means to said structure with said contact faces positioned on the course of said contact element displaced from opposite sides of said contact element; and,
bias means attached to said contact means co-acting with said contact faces for restraining displacement of said contact faces, whereby displacement of the actuator moving member may be restrained.

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**4,110,803**

## MAGNETIC HEAD ASSEMBLY ADJUSTABLE RELATIVE TO ROLL, PITCH AND AZIMUTH

**Robert H. Townsend, Richardson, Tex., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Jan. 28, 1977, Ser. No. 763,471**

**Int. Cl.[2] G11B *5/55, 5/80, 21/08***

**U.S. Cl. 360—109** **16 Claims**

1. A magnetic card transport system comprising:
a card support member having a top surface and a card guide surface thereon,
a frame supported on said card support member,
a lead screw supported from said frame and alignable relative to said card guide surface,
a guide shaft supported from said frame and

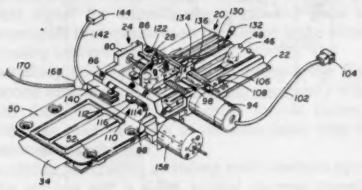
aligned along an axis parallel to the longitudinal axis of said lead screw,

a magnetic head support,

a magnetic head attached to said magnetic head support,

a thread receiving structure formed in said magnetic head support and aligned along an axis transverse to the longitudinal axis of said magnetic head,

a guide shaft receiving structure formed in said magnetic head support and aligned along an axis transverse to the longitudinal axis of said magnetic head, and



a clamp member attached to said magnetic head support, said clamp member having a shaft extending from said magnetic head support, a biasing spring positioned between said shaft and said magnetic head support for biasing said shaft towards said magnetic head support, and a foot member pivotally attached to the end of said shaft remote from said magnetic head support and positionable to engage said thread receiving structure against the threads of said lead screw and said guide shaft receiving structure against said guide shaft whereby said magnetic head is aligned relative to the card guide surface of said card support member.

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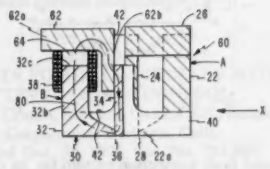
**4,110,804**

## READ/WRITE AND TUNNEL ERASE MAGNETIC HEAD ASSEMBLY

**Daniel Owen Castrodale; Jeffrey Lynn Lovgren; Ralph Arthur Russell, and Karl Allen Shidler, all of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jul. 21, 1977, Ser. No. 817,755**
**Int. Cl.[2] G11B *5/26***
**U.S. Cl. 360—118** **7 Claims**



7. A magnetic head assembly for recording or reading data and for erasing edge portions of newly recorded data and previously recorded data comprising:

a center read/write layer and a pair of outer erase layers on opposite sides of the center layer for recording or reading and erasing data associated with a single data track,

said center layer including a core of magnetically permeable material which is closed except for a transducing gap provided in the core on an active surface of said head assembly, each of said outer layers including first and second core portions of magnetically permeable material having ends of these portions at said active surface providing an erasing gap on said active surface spaced longitudinally of said center and erasing layers with respect to said read/write gap and said first and second core portions having remote ends that are remote from said active surface, said second core portions being opposite to each other transversely of said center and erase layers and extending normally to said active surface and said first core portions of said outer layers being opposite to each other transversely of said center and erase layers and extending slantwise with respect to said active surface and longitudinally of said erase and center layers and away from said second core portions so as to provide a spacing of said first core portions with respect to said second core portions at their said remote ends;

a read/write electrical coil disposed about said core of said center layer;

a single erase electrical coil disposed about both of said first core portions of said outer layers and extending in a direction away from said active surface and beyond said remote ends of said first core portions; and

an L-shaped bar of magnetically permeable material having one leg thereof in face to face contact with said second core portions and having its other leg in contact with an end of said single erase electrical coil so as to thereby provide gaps between said bar and said remote ends of said first core portions and within said single erase electrical coil.

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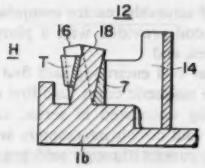
**4,110,805**

## MAGNETIC TAPE CASSETTE WITH OPPOSITELY INCLINED GUIDE MEMBERS FLANKING THE RECORDING/REPRODUCING STATION

**Kengo Oishi, Odawara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan**

**Filed Jun. 24, 1977, Ser. No. 809,815**
**Claims priority, application Japan, Jul. 1, 1976, 85812[U]**
**Int. Cl.[2] G11B *23/02***
**U.S. Cl. 360—132** **4 Claims**



1. In a magnetic tape cassette including a generally flat, hollow, rectangular case member (1), a windowed recording and reproducing station (12) defined at one edge of the case member and including a spring biased pressing pad (7) for urging a magnetic tape (T) against a recording and reproducing head insert through the window, and a plurality of fixed and rotary guide members (4, 5, 9, 10) disposed within the case member to guide a magnetic tape through the recording and reproducing station along a defined path of travel and including a pair of fixed guide members (6, 8) positioned in the same horizontal plane and disposed on opposite sides of the recording and reproducing station upstream and downstream thereof, respectively, relative to the forward direction of tape travel, the improvement characterized by:

the tape contacting surfaces of said pair of fixed guide members (16, 18, 26, 28, 36, 38) being oppositely inclined relative to the tape-contacting surface of an inserted magnetic recording and reproducing head at an angle of from 0.5° to 5.0°, whereby a travelling tape rides up on and is tilted toward the tape head by one of said pair of fixed guide members and rides down on and is tilted away from the tape head by the other of said pair of fixed guide members so that the tape assumes a stable position at which the upward and downward forces of the oppositely inclined fixed guide members are balanced, and wherein the intermediate transitional orientation of said tape between said pair of fixed guide members at the recording and reproducing station is therefore always central and vertical

relative to said head, to thereby correct and control any lateral tape displacement or misinclination due to cassette deformations, deck orientation, and the like.

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**4,110,806**

## CIRCUIT INTERRUPTING APPARATUS FOR USE IN DIRECT CURRENT CIRCUITS

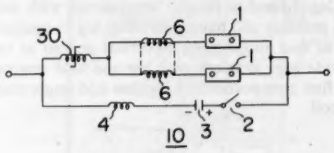
**Minoru Murano, Tokyo; Satoru Yanabu; Tohoru Tamagawa, both of Yokohama, and Hisatoshi Ikeda, Zushi, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Japan**

**Filed Jan. 3, 1977, Ser. No. 756,345**

**Claims priority, application Japan, Jan. 8, 1976, 51-1127; Jan. 20, 1976, 51-4635; Jan. 20, 1976, 51-4637**

**Int. Cl.[2] H02H 7/22**

**U.S. Cl. 361—4** **5 Claims**




1. In current interrupting apparatus for use in a direct current circuit comprising parallelly connected branch circuits, each of said branch circuits including a circuit interrupter and a saturable reactor having a coil connected in series with said circuit interrupter and a magnetic core which saturates at a predetermined value of the current flowing through said coil; and, a commutating circuit including a capacitor and a switch connected in parallel with said branch circuits, the improvement wherein said saturable reactor comprises

a first annular coil provided with a plurality of saturable magnetic cores, and

a second annular coil encircling said first annular coil and said saturable magnetic cores, said first and second annular coils being connected in series, said switch being closed when said circuit interrupters are opened to pass commutating current through said branch circuits from said capacitor.

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**4,110,807**

## CONTINUITY MONITORING SYSTEM

**Donald Eugene Neuhouser, Huntington, W. Va., assignor to Harvey Hubbell, Incorporated, Orange, Conn.**

**Filed May 2, 1977, Ser. No. 793,112**

**Int. Cl.[2] H02H 1/02**

**U.S. Cl. 361—42** **11 Claims**

3. A system for monitoring the resistance of the pilot and ground conductors in an electrical cable, comprising,

transformer means having a primary winding and a secondary winding,

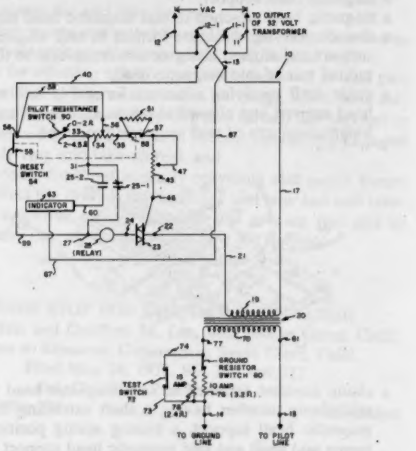
the secondary winding having the pilot and ground conductors connected thereto,

a relay in series with said primary winding for interrupting power in the cable, said relay having drop-out and pick-up states and interrupting power in the cable when in the drop-out state and allowing restoration of power in the cable when in the picked up state, the voltage required to pick-up said relay being of a predetermined greater amplitude than the drop-out voltage,

first and second series circuits, said relay connected in parallel with said circuits,

said first series circuit including a switching device for controlling the states of said relay, said first circuit additionally including a first resistive portion of a variable resistor for calibrating said relay to drop-out with certain values of resistance in the pilot and ground conductors,

said second series circuit including a second resistive portion of said variable resistor, and




switch means for selectively connecting said second portion of said variable resistor into said second circuit to change the loading of said relay.

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**4,110,808**

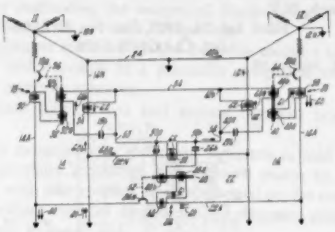
## GROUND FAULT PROTECTION SYSTEM FOR MULTIPLE SOURCE DISTRIBUTION NETWORKS

**Charles F. Hobson, Jr., Southington, and John D. Hamilton, Farmington, both of Conn., assignors to General Electric Company, New York, N.Y.**

**Filed Sep. 2, 1977, Ser. No. 830,265**

**Int. Cl.[2] H02H 3/28**

**U.S. Cl. 361—44** **11 Claims**



7. A ground fault protection system for an electrical power distribution network including at least first and second polyphase sources with the neutral point of at least one source solidly connected to ground, the source neutral points being interconnected by a ground circuit path, each source capable of feeding associated first and second polyphase main buses interconnected by a polyphase tie bus, and each main bus including a neutral bus conductor connected to the neutral point of its associated source and connected together by a neutral bus conductor included in the tie bus, said system comprising, in combination:

A. first and second main circuit interrupters, each including

(1) main contacts respectively connecting the first and second sources to the first and second main buses,

(2) a separate phase current transformer coupled with each phase bus conductor of the first and second main buses, each phase current transformer having a secondary winding in which is developed a current signal

proportional to the current flowing in the coupled phase bus conductor,

(3) first and second neutral current transformers respectively coupled with the neutral bus conductors of the first and second main buses, each said neutral current transformer having a secondary winding in which is developed a current signal proportional to the current flowing in the coupled neutral bus conductor, and

(4) current differential circuit means including said secondary windings of the associated phase and neutral current transformers and operating to develop a ground fault signal for tripping the associated main circuit interrupter in response to an imbalance in the secondary winding current signals received thereby, and

(5) auxiliary contacts operating to connect the first and second neutral current transformer secondary windings into their associated differential circuit means only while the main contacts of the associated main circuit interrupter are closed;

B. a tie circuit interrupter including main contacts operating in the tie bus and a third neutral current transformer coupled with the neutral bus conductor of the tie bus and having a secondary winding in which is developed a current signal proportional to the current flowing in the tie neutral bus conductor; and

C. means connecting said first, second and third neutral current transformer secondary windings in a first circuit loop;

D. whereby, with the main contacts of any two of the first main, second main and tie circuit interrupters closed and one of said main contacts of the above circuit interrupters being open,

(1) under normal neutral loading conditions, neutral current returning to one of the sources through the tie neutral bus conductor and the neutral bus conductor of the main bus associated with the other source induces, via the associated neutral current transformers, a current in said circuit loop which circulates through appropriate current differential circuit means such as to maintain overall current signal balances therein, and

(2) under ground fault conditions, any ground fault current returning to the one of the sources feeding the fault through the neutral bus conductors of the main and tie buses induces, via said neutral current transformers, a current which circulates in said circuit loop exclusive of said current differential circuit means to insure overall current signal imbalances therein indicative of the ground fault current magnitude.

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**4,110,809**

**SOLID STATE POWER CONTROLLER WITH LOW LEVEL SIGNAL CONTROL**

**Michael Joseph Cronin, Sherman Oaks, Calif., assignor to Lockheed Aircraft Corporation, Burbank, Calif.**

**Filed Dec. 30, 1976, Ser. No. 755,560**
**Int. Cl.[2] H02H *3/08***
**U.S. Cl. 361—95** **11 Claims**

3. A power controller circuit for a load circuit comprising:

a power darlington circuit including an emitter and collector for connection between a power supply and a load, and a base for controlling conductivity between said emitter and collector;

a solid state switching means including first means responsive to impression of an activating positive potential thereon to impress a conducting bias on said darlington base;

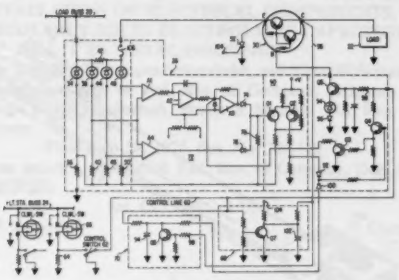
a positive supply voltage source displaced from said darlington and said first switching circuit;

a control circuit comprising:

current limiting lamp means connecting to said voltage source;

a control switch having a first terminal connected to said lamp means; and

a control conductor connected to a second terminal of said control switch, whereby closure of said control switch will impress an activating positive potential on said solid state means without lighting said lamp means and imposition of ground potential on said control conductor with said control switch closed will cause said lamp to light while limiting current through the control circuit; and



a load current responsive device including logic means connected to said first switching circuit to render said solid state means ineffective to impress a conducting bias on said darlington base upon the load current attaining an overload current having at least one preselected overload amplitude for at least one corresponding preselected period of time.

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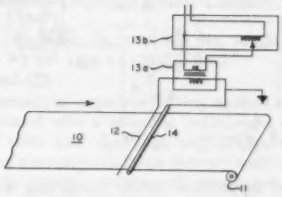
**4,110,810**

**STATIC CHARGE NEUTRALIZER AND PROCESS**

**Edward Joseph Moore, Florence, S.C., and John Edward Owens, Hockessin, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Mar. 10, 1977, Ser. No. 776,231**
**Int. Cl.[2] H05F *3/04***
**U.S. Cl. 361—213** **24 Claims**




1. A web winding device for a dielectric web material comprising:

a driven winding roll onto which the web is wound;

a nip roll in pressure contact with the web wound on the winding roll and at which pressure contact the web is first laid onto the winding roll;

a conductive bare wire less than 0.03 cm in diameter extending across and parallel with the web and located 0.6 to 8 cm from the web on the winding roll in an arc of 0° to 90° after contact by the web with the winding roll; and

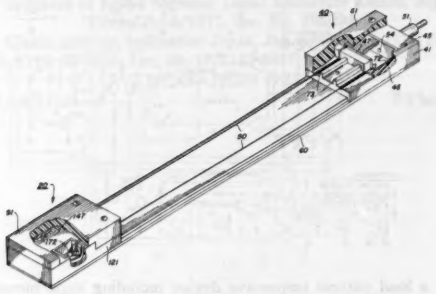
means for impressing an AC voltage on the wire of 3000 to 10,000 volts at 40 to 70 Hertz.

**4,110,811**

## SUPPORT STRUCTURE FOR A CORONA GENERATING DEVICE

**Fred F. Hubble, III, Rochester, and John B. Tasseff, II, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed May 31, 1977, Ser. No. 802,165**
**Int. Cl.[2] H05F *3/00*; H01T *19/00***
**U.S. Cl. 361—225** **32 Claims**



26. A corona discharge device having a plurality of coronodes, a pair of insulating assemblies for supporting said coronodes, a first of said assemblies including a first open volume conductive insert and a first cavity lined in part by said insert, the second of said assemblies having a plurality of second open volume conductive inserts and a plurality of second cavities lined in part by said inserts, each said coronodes terminating within said first insert on one end thereof and within said second inserts on the other end thereof.

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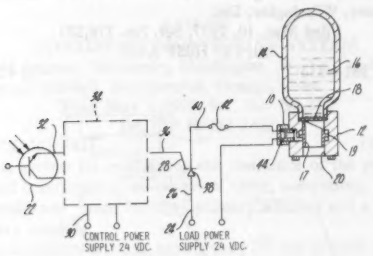
**4,110,812**

## NON-RECURRENT PULSE GENERATOR

**Gregory Arutunian, Detroit, and Anthony J. Monte, Utica, both of Mich., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Sep. 16, 1976, Ser. No. 723,837**
**Int. Cl.[2] A62C *35/08***
**U.S. Cl. 361—248** **1 Claim**




1. In a fire suppressant system comprising a bottle (**14**) charged with pressurized suppressant; a valve (**18**) controlling the discharge of suppressant from the bottle; a pyro-technic explosive squib (**10**) for operating said valve, said squib including a resistive heating element (**44**) having an activating current of about 6 amperes; a high amperage load voltage source (**24**); a gated power switch (**38**) connected to said voltage source for delivering high amperage current to the aforementioned resistive heating element; a low amperage control voltage source (**30**) for delivering a control signal to the gate of the aforementioned power switch; and a flame responsive detector switch (**22**) connected to the control voltage source for initiating the control signal:

the improvement comprising a time delay fuse (**42**) connected in series with the power switch and resistive heating element for limiting the time interval during which the resistive heating element is subjected to current flows appreciably higher than the aforementioned activating current; said fuse having a time-current decay curve wherein the initial current is in excess of 25 amperes and the current after 1 second is about 9 amperes.

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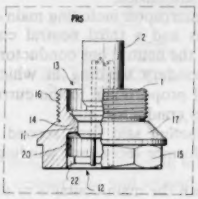
**4,110,813**

## IGNITION DEVICE FOR PASSIVE RETENTION SYSTEM

**Peter-Matthias Hoheisel, Esslingen, and Gerhard Komander, Altbach, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Dec. 17, 1975, Ser. No. 641,772**
**Claims priority, application Fed. Rep. of Germany, Dec. 20, 1974, 2460427**
**Int. Cl.[2] F42C *19/02***
**U.S. Cl. 361—248** **18 Claims**



1. An ignition device for a passive retention system, characterized in that an ignition unit for being coupled into a housing means includes two connecting pins having free ends projecting out of a coupling means of the ignition unit, the connecting pins being operatively connected in the region of the opposite ends thereof with a filament means, the filament means being surrounded by an ignitable ignition composition arranged within a casing means, the coupling means including a socket member having a predetermined configuration prior to coupling with the housing means, the socket member being provided with a portion having a first cross section adjoining a conical chamfered portion, the conical chamfered portion adjoining an adapter portion having a smaller cross section than the first cross section, the coupling means enabling a rapid installation and tight seal of the ignition unit with the housing means upon coupling.

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**4,110,814**

## WATTHOUR METER ENCLOSURE FOR USE IN REMOTE METER READING PACKAGES

**James S. Britton, Raleigh, and David W. Morgan, Zebulon, both of N.C., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

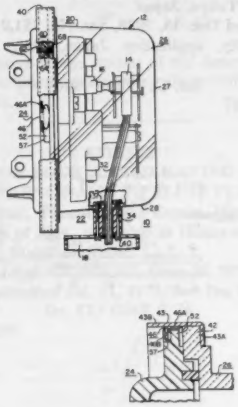
**Filed Dec. 29, 1976, Ser. No. 755,375**
**Int. Cl.[2] H02B *9/00***
**U.S. Cl. 361—371** **6 Claims**

1. A watthour meter enclosure comprising:

a cup-shaped cover including a closed forward end, a side portion extending to an open end, a side portion including an opening, and a circular mounting flange extending radially outward at said open end along front and rear radial surfaces;

a circular locking rim having a forward portion overlapping said front radial surface of the cover flange and an integral cylindrical body extending rearward from said front portion so that the inner wall of said cylindrical body extends over and beyond the outer periphery of the cover flange, said locking rim including a plurality of locking tab members carried on said inner wall of said cylindrical body and extending from said inner wall in separately spaced relationships from each other and from the cover flange so that the cover flange is freely rotatable within said locking rim;

a base assembly supporting a watthour meter movement and a meter data sending unit responsive to said movement, said sending unit including plural conductors intended for connection externally of said cover, said base assembly including plural arcuate attachment lugs extending radially at the outer periphery thereof in a spaced apart relationship, said attachment lugs having forward and rear radial surfaces thereon, said attachment lugs rotationally receiving said plurality of locking tabs in engagement with the rear radial surfaces thereof and attaching said cover to said base assembly so as to be rotatable to a predetermined



position relative to said locking rim and said base assembly, the side opening of said cover having a desired arcuate position and receiving said plural conductors with said cover being at said predetermined position; and

a rotational locking arrangement including at least one recess extending into said rear radial surface of the cover flange at a predetermined arcuate position relative to the side opening, a hole in said base assembly aligned with said recess in said cover flange with said cover opening being in said desired arcuate position, and fastener means extending within both the aligned hole and recess to retain said cover in the predetermined rotated position thereof.

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**4,110,815**

## SOLID ELECTROLYTIC CAPACITOR

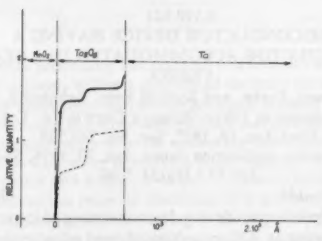
**Gilbert Frade; Balint Escher, and Dominique Prince, all of Paris, France, assignors to Societe Lignes Telegraphiques et Telephoniques, Paris, France**

**Filed Sep. 28, 1976, Ser. No. 727,429**

**Claims priority, application France, Oct. 6, 1975, 75 30491**

**Int. Cl.² H01G 9/00**

**U.S. Cl. 361—433** **8 Claims**




1. In a solid electrolyte capacitor made of a sintered tantalum anode, a dielectric consisting of a tantalum oxide layer obtained through anodic oxidation of said tantalum anode and a cathode comprising manganese dioxide which covers said tantalum oxide layer and a conductive layer deposited on said manganese dioxide, the improvement which comprises an impurity selected from the group consisting of trivalent impurities and hexavalent impurities distributed non-uniformly through the thickness of said tantalum oxide layer.

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**4,110,816**

## INSTALLATION OF ELECTRICAL COMPONENTS, PARTICULARLY SOLID ELECTROLYTIC CAPACITORS IN METAL HOUSINGS

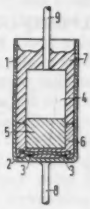
**Andreas Deckert, Ellwangen-Schrezheim, and Hans Wolscheck, Hermaringen, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed Oct. 28, 1976, Ser. No. 736,422**

**Claims priority, application Fed. Rep. of Germany, Dec. 18, 1975, 2557201**

**Int. Cl.² H01G 9/00**

**U.S. Cl. 361—433** **7 Claims**



1. In an electrical component comprising: an electrical component element mounted in a cup shaped housing, said component element having an electrical terminal which is electrically connected to said housing via a soft solder, the improvement which comprises providing a soft-solderable metal part welded to the inside of said housing and electrically connected by said soft solder to said electrical terminal, said housing comprising a non-soft-solderable metal having at least some aluminum therein, and a terminal lead separate from said soft-solderable metal part, said terminal lead connected to the outside of said housing.

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**4,110,817**

## ELECTROLYTIC CAPACITOR WITH AN ELECTROLYTE INCLUDING DIBASIC ACID COMPOUNDS

**Sidney D. Ross, and Franz S. Dunkl, both of Williamstown, Mass., assignors to Sprague Electric Company, North Adams, Mass.**

**Filed Jul. 16, 1976, Ser. No. 705,861**

**Int. Cl.² H01G 9/02**

**U.S. Cl. 361—433** **2 Claims**

1. An electrolytic capacitor having at least one aluminum electrode coated with a dielectric oxide layer, an electrolyte contiguous with said electrode, said electrolyte consisting essentially of ammonium adipate in combination with a member from the group consisting of ammonium succinamate, succinamic acid, succinamide and succinimide, dissolved in a solvent consisting essentially of ethylene glycol and a minor amount of water, said member being in an amount sufficient to reduce the percent increase in resistivity with time at the operating temperature of the capacitor.

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**4,110,818**

## ILLUMINATED FLAG OR PENNANT

**Raymond Hempsey, 248 Watkins St., Philadelphia, Pa. 19148**

**Filed Aug. 29, 1977, Ser. No. 828,623**

**Int. Cl.² F21V 7/04**

**U.S. Cl. 362—32** **10 Claims**

1. An illuminated flag comprising a flexible sheet-like flag

having opposed lateral surfaces, means for attachment of said flag to an existing radio antenna having a source of electrical energy approximate thereto, an electrically operated light source, means for coupling said light source to said source of electrical energy, fiber optic cable means, one end of said fiber optic cable means being disposed receiving light energy generated by said source of light, the other end of said fiber optic cable means being distributed such that the free ends of the individual fiber optic filaments of said fiber optic cable means are disposed along at least one said lateral surface so as to be visually accessable tc a user and arranged such that said free ends form indicia.

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**4,110,819**

## HEADLIGHT TILTING CONTROL DEVICE OF MOTOR VEHICLE

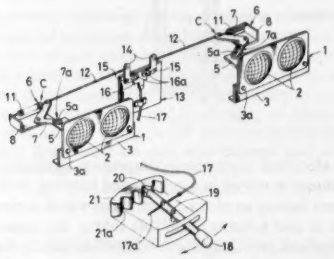
**Masao Ishikawa, Yokohama, Japan, assignor to Nissan Motor Company, Ltd., Japan**

**Filed Nov. 10, 1976, Ser. No. 740,711**

**Claims priority, application Japan, Nov. 13, 1975, 50-153439[U]**

**Int. Cl.² B60Q *1/06***

**U.S. Cl. 362—40** **2 Claims**



1. Headlight tilting control device of a motor vehicle comprising, in combination:

two headlight frames arranged on the opposite lateral ends of the vehicle body front portion, each said frame having one end pivotally mounted on a fixed part of the vehicle body and the other end constantly loaded by spring means to maintain said headlight frame in a predetermined tilted position;

tilt adjusting means for providing tilting movement of said headlight frames against the load of said spring means;

manually operating means located on a fixed part of the vehicle body accessible to an operator comprising a manually moveable lever pivotally mounted on a fixed part of the vehicle body, a positioning plate having a plurality of grooves in any of which said manually moveable lever is received and held in position upon pivotal movement of said lever; and

intermediate linkage means linked between said tilt adjusting means and said manually operating means for transferring the manually operating effort applied to a positioning plate having a plurality of grooves in any of which said manually moveable lever is received and held in position upon pivotal movement of the manually moveable lever, said intermediate linkage means comprising

a linkage frame located intermediate of said two headlight frames and extending substantially in parallel with the headlight frames,

a moveable plate mounted on said linkage frame to be moveable relative thereto,

two oppositely directed L-shaped levers pivotally carried on said linkage frame, each said L-shaped lever having one end connected with said moveable plate and an opposite end,

two connecting cables each interconnecting said opposite end of the angled arm and said opposite end of the L-shaped lever, and

a drive transferring cable having one end connected with said moveable plate and the other end length-adjustably connected with said manually moveable lever.

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**4,110,820**

## SPARE LAMP HOLDING DEVICE FOR A LIGHT SUPPLY DEVICE FOR ENDOSCOPE

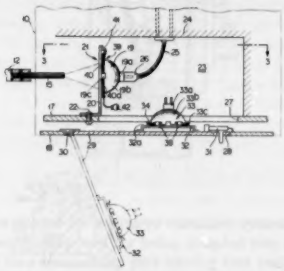
**Katunaga Konoshima, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Dec. 16, 1976, Ser. No. 751,018**

**Claims priority, application Japan, Dec. 24, 1975, 50-173691[U]**

**Int. Cl.² F21V *19/04***

**U.S. Cl. 362—207** **3 Claims**



1. In a light supply device for an endoscope including

a casing;

a chamber formed in said casing;

a light guide bundle, one end of which is mounted in one side wall of the casing to be disposed in the chamber; and

a first holding means for holding a lamp in use to cause the lamp to be disposed adjacent to said one side wall of the casing in the chamber and emit light to said one end of the bundle;

a spare lamp holding device comprising a cover hinged to another side wall of the casing, and normally covering an opening formed in said other side wall of the chamber to communicate with the chamber; and

a second holding means provided on the inner surface of the cover and holding a spare lamp at that portion of the chamber which is located opposite to said one side wall with respect to the first holding means and where the spare lamp is not brought into contact with the lamp in use when the cover is closed, said spare lamp being pulled out of the chamber when the cover is opened.

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**4,110,821**

## SEMICONDUCTOR DEVICE HAVING A SEMICONDUCTOR ACCOMMODATED IN A SEALED VESSEL

**Hiroshi Hisano, Fuchu, and Kyoichi Sato, Yokohama, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Japan**

**Filed Jan. 19, 1977, Ser. No. 760,739**

**Claims priority, application Japan, Jan. 20, 1976, 51-5300**

**Int. Cl.² H02M *7/00***

**U.S. Cl. 363—141** **7 Claims**

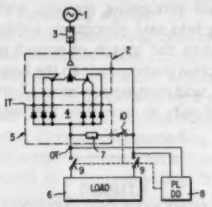
1. A semiconductor device for converting electric power flowing between an A.C. power supply and a load comprising:

a sealed vessel filled with a cooling medium;

a rectifier unit accommodated in the sealed vessel and adapted to be energized by the A.C. power supply for applying rectified power to the load;

means for detecting deenergization of the rectifier unit and providing an output signifying the same;

a heating unit accommodated in the sealed vessel; and




means responsive to the output of the detecting means for applying rectified power from the rectifier unit to the heating unit.

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**4,110,822**

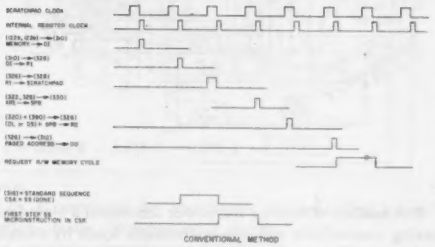
## INSTRUCTION LOOK AHEAD HAVING PREFETCH CONCURRENCY AND PIPELINE FEATURES

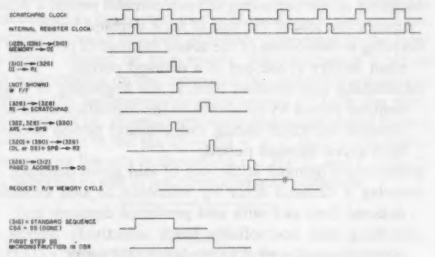
**Marion G. Porter, Phoenix, and Garvin Wesley Patterson, Glendale, both of Ariz., assignors to Honeywell Information Systems, Inc., Waltham, Mass.**

**Continuation of Ser. No. 562,272, Mar. 26, 1975, abandoned. This application Jul. 11, 1977, Ser. No. 814,599**

**Int. Cl.[2] G06F *9/18***

**U.S. Cl. 364—200** **7 Claims**




1. A data processing unit coupled to a memory and including general registers within a scratchpad memory for storing operands, an instruction buffer for storing a number of program instructions fetched from said memory and an instruction fetch and execution apparatus for executing instruction fetch and instruction execusion operations under microprogram control during minor and major clock pulse cycles wherein each program instruction requires execution of a predetermined number of microinstructions during a corresponding number of minor clock pulse cycles which comprise a major clock pulse cycle, said apparatus comprising:

an addressable control memory having a plurality of locations for storing a plurality of microinstructions, a first one of said microinstructions being coded to specify a number of microoperations, one required to terminate the execution of a first one of said program instructions and another microoperation for beginning the processing of next one of said program instructions and a last one of said microinstructions being coded to specify a number of microoperations, one microoperation required for execution of said first one of said program instructions and another microoperation for initiating the processing of a next instruction;

first means coupled to said control memory and operative in response to said last one of said microinstruction read out during a last minor clock pulse cycle of said first instruction to execute said one microoperation for completing the major cycle of operation of said first one of said program instructions;

second means coupled to said control memory and operative in response to said last one of said microinstructions during said last minor clock pulse cycle to execute said another microoperation for initiating the processing of said next instruction in parallel with the execution of microoperations of said first one of said program instructions;

third means coupled to said control memory and operative in response to said first one of said microinstructions during a first minor clock pulse cycle of beginning of a major clock pulse cycle of said next one of said program instructions to execute said another microoperation for completing an operation required in the execution of said second one of said program instructions; and,

fourth means coupled to said control memory and operative in response to said first one of said microinstruction during said first minor clock pulse cycle to execute said one microoperation for terminating the execution of said first one of said program instructions in parallel with the execution of said next one of said program instructions.

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**4,110,823**

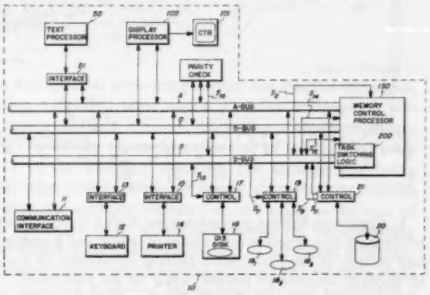
## SOFT DISPLAY WORD PROCESSING SYSTEM WITH MULTIPLE AUTONOMOUS PROCESSORS

**David Cronshaw, Torrance; Jack E. Shemer, Los Angeles; William D. Turner, San Marino; David Hartke, Pasadena; James R. Keddy, Huntington Beach; Wilbur E. DuVall, Victorville, and Warren M. Sterling, Hermosa Beach, all of Calif., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Feb. 17, 1977, Ser. No. 769,594**

**Int. Cl.[2] G06F *15/20, 3/14, 13/00***

**U.S. Cl. 364—200** **1 Claim**




1. A data processing system adapted for text editing comprising:

an external bus system;

a text processor including a memory portion, said text processor being coupled to said bus system, said text processor receiving input signals from said bus system and producing at a first cyclic rate predetermined command signals in response to said input signals;

a semi-autonomous memory control processor coupled to said bus system, said memory control processor including

a main memory and an accelerator memory for storing data signals and instruction signals, said main memory periodically advancing at a second cyclic rate data therefrom to said accelerator memory in response to receipt by said memory control processor of selected ones of said command signals;

isolating means connected between said text processor and said bus system and responsive to signals received from said memory control processor for decoupling said text processor from the communications on said bus system during the times when said memory control processor is advancing said data signals and instruction signals from said main memory of said memory control processor to said accelerator memory of said memory control processor;

a semi-autonomous display processor coupled to said bus system, said display processor including a video display means and a list of memory means independent of said memory portion of said text processor, said list memory having signals stored therein and being responsive to selected other ones of said command signals and said video display means being rendered cyclically operative independent of said selected other ones of said command signals for producing images of characters and graphics at a third cyclic rate according to the signals stored in said list memory; and

at least one data input device coupled to said bus system, said data input device being coupled through said external bus system to said memory portion of said text processor and utilizing as its memory said memory portion of said text processor.

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**4,110,824**

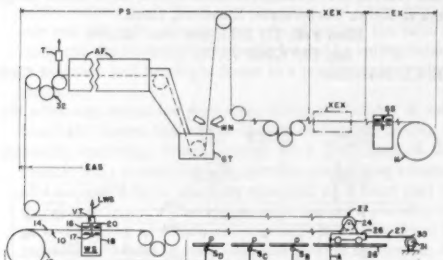
## METHOD AND APPARATUS FOR CONTINUOUSLY PROCESSING STRAND

**Homer P. Halsey; Lowell E. Reed, both of Poland Township, Mahoning County, and David C. Hildebrand, Boardman Township, Mahoning County, all of Ohio, assignors to Youngstown Sheet and Tube Company, Youngstown, Ohio**

**Filed May 18, 1977, Ser. No. 798,146**

**Int. Cl.[2] B65H *25/20*; G06F *15/20***

**U.S. Cl. 364—472** **15 Claims**




1. Apparatus for use in conjunction with a continuous strand processing line wherein movement of the strand is continued in one section of the line despite halting movement of the strand in another section to permit work to be performed on the strand in said other section, said line including a work station, an accumulator section having an accumulator movable along a path, and a processing section downstream of said accumulator section, said apparatus comprising:

(1) work signal means issuing a work signal when work is performed at said work station;

(2) accumulator position signal means issuing a position signal representative of the position of said accumulator along its path; and

(3) strand signal means for providing a signal for ascertaining the strand length passing into said processing section;

(4) computation circuit means for receiving said work signal and said position signal and including comparison means for comparing a preset value representing the strand path distance between said work station and a preselected position in said processing section, with the length of strand passing into said processing section and issuing a new signal when the length of strand passing into said processing section corresponds to the length of said strand path distance, said comparison means being initiated by a position signal only at such time that said work signal is present.

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**4,110,825**

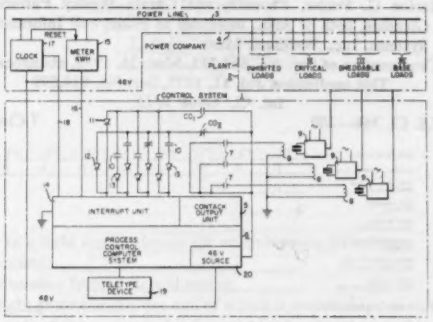
## CONTROL METHOD FOR OPTIMIZING THE POWER DEMAND OF AN INDUSTRIAL PLANT

**Richard Q. Fox, Orlando, Fla.; Donald E. Sigut, Herminie, and John H. McWhirter, Penn Hills, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Apr. 28, 1977, Ser. No. 791,827**

**Int. Cl.[2] G06F *15/06*; G05B *15/00***

**U.S. Cl. 364—492** **4 Claims**




1. A method of limiting the power demand of a plant facility having controllable and non-controllable loads by switching said controllable loads during demand periods and selectively in accordance with a pre-established priority list, comprising the steps of:

assigning at the beginning of each demand period a demand limit to be met at the end of such demand limit;

deriving an indication of the actual demand of power by said plant facility at the end of a demand period;

establishing said demand limit at the beginning of a given demand period by reference to the indication of an actual demand recorded during one demand period preceding such given demand period;

predicting a demand at the end of said given demand;

deriving a demand error by reference to said established demand limit and with said predicted demand; and

switching said controllable loads selectively during said given demand period to minimize said error.

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**4,110,826**

## APPARATUS AND PROCESS FOR COLOR-IDENTIFICATION

**Klaus Möllgaard; Hans Keller; Ulrich Sendtko, all of Kiel, and Rüdiger Sommer, Raisdorf, all of Germany, assignors to Dr.-Ing. Rudolf Hell GmbH., Kiel, Germany**

**Filed Oct. 1, 1976, Ser. No. 728,956**

**Claims priority, application Fed. Rep. of Germany, Oct. 7, 1975, 2544703**

**Int. Cl.[2] G01J *3/50*; G06G *7/75***

**U.S. Cl. 364—526** **21 Claims**

17. A circuit-arrangement for the identification of a prede-

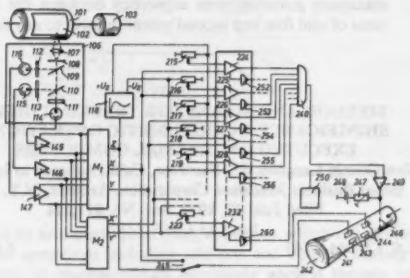
termined color from a plurality of colors in an object, comprising, in combination:

photo-electrical transducer means for obtaining of trichromatic color - measuring signals;

threshold-value circuit-means and coincidence-circuits connected to said threshold-value circuit-means for delineating a color-identification-region within said plurality of colors, said signals being defined by a set of coordinates, said threshold value-circuit-means including a plurality of threshold-value circuits corresponding to predetermined color-identification regions, each coincidence circuit being connected to a corresponding threshold-value circuit, transforming means connected to the output of said transducer means for transforming the coordinates and having the following transformation properties:

$$x = 0.789\ R - 0.211\ G - 0.578\ B$$

$$y = -0.211\ R + 0.789\ G - 0.578\ B$$



$$z = 0.578\ R + 0.578\ G + 0.578\ B,$$

wherein

R, G, B, represent the coordinates corresponding to said trichromatic color-measuring signals,

$x$, $y$, represent chrominance signals, and

$z$ represents a luminance-signal, said transforming means including a matrix providing

the chrominance signals ($x$), and the luminance signal ($z$), subtracting-units connected to the chrominance signal output of said matrix, and a function generator connected to the luminance-signal output of said matrix, for generating a signal which is dependent on the luminance ($z$), said subtracting units subtracting the luminance-dependent signal ($z$) from the chrominance signals ($x$, $y$), said luminance-dependent signal having a constant value in the $((z/2) - c_1) < z < (z/2 + c_2)$ region and decreasing linearly in the region $z < ((z/2)$, and $z > ((z/2) + c_2)$, wherein $c_1$ and $c_2$ are predetermined constants.

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## 4,110,827
## LOAD CYCLING WITH SPACE TEMPERATURE FEEDBACK

**Gideon Shavit, Highland Park, Ill., assignor to Honeywell Inc., Minneapolis, Minn.**

**Filed Oct. 29, 1976, Ser. No. 737,621**

**Int. Cl.**[2] **F24F** *3/00;* **G05B** *11/32;* **G05D** *23/19;* **G06F** *15/20*

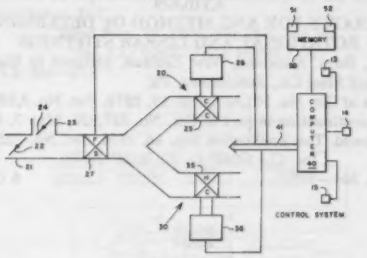
**U.S. Cl. 364—550** **24 Claims**

1. A system for cycling loads in a building comprising:

physical condition responsive means adapted to be mounted internally in said building for sensing a physical condition;

control means for cycling said loads on and off according to a predetermined cycle rate, each load having an on time and an off time within a cycle, said control means being connected to said physical condition responsive means for resetting said off time according to said physical condition; and,

connecting means connected to said control means and adapted to be connected to said loads for cycling said



loads whereby said off time of said loads are reset by said physical condition responsive means.

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## 4,110,828
## ERROR PREVENTING INCREMENTAL MEASURING SYSTEM

**Alfons Baumgartner, Grassau; Walter Berg, Balingen; Horst Burkhardt, Stein an der Traun; Jürgen Läubin, Rosenfeld, and Helmut Schlick, Traunreut, all of Germany, assignors to Dr. Johannes Heidenhain GmbH, Traunreut, Germany**

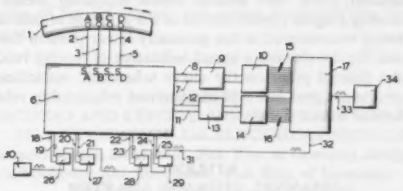
**Filed Feb. 20, 1973, Ser. No. 334,036**

**Claims priority, application Fed. Rep. of Germany, Feb. 16, 1972, 2207224**

**The portion of the term of this patent subsequent to Feb. 29, 1992, has been disclaimed.**

**Int. Cl.**[2] **G06F** *11/10*

**U.S. Cl. 364—562** **14 Claims**



1. An incremental measuring system for lengths or angles, comprising a divided scale and a plurality of scanning elements, every scanning element delivering a signal changing between two binary values upon motion of the divided scale relatively to the scanning elements, the arrangement being such that some combinations of binary values of the various signals from the scanning elements do not occur in the case of faultless operation of all scanning elements (in the following called forbidden combinations contrary to permitted combinations), further comprising a logical network fed by the signals from the scanning elements, the logical network producing a binary output signal which is equal to a predetermined one of the signals from the scanning elements as long as a permitted combination of binary values is fed to the logical network, and which binary output signal is different from the said predetermined one of the signals from the scanning elements as long as a forbidden combination of binary values is fed to the logical network, further comprising at least two counters one of them being fed by the output signal of the logical network and an other of them being fed directly by the said predetermined one of the signals from the scanning elements, and further comprising a comparison circuit having a plurality of comparators for

comparing the respective individual positions of the said counters.

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**4,110,829**

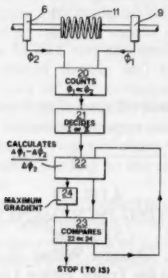
## APPARATUS FOR AND METHOD OF DETERMINING ROTATIONAL AND LINEAR STIFFNESS

**John T. Boys, Auckland, New Zealand, assignor to Standard Pressed Steel Co., Jenkintown, Pa.**

**Division of Ser. No. 507,417, Sep. 19, 1974, Pat. No. 3,982,419, and a continuation-in-part of Ser. No. 357,920, May 7, 1973, abandoned. This application Sep. 16, 1976, Ser. No. 723,866**

**Int. Cl.[2] G06F** *15/20;* **B23P** *19/06*

**U.S. Cl. 364—577** **6 Claims**




1. Apparatus for sensing a desired point on a curve representing the variation of two related inputs, generated by an external source, wherein said curve has a generally linear portion and said desired point lies beyong said generally linear portion, said apparatus comprising:

first means for developing a signal representative of the instantaneous gradient of said curve, and

second means responsive to said gradient signal for determining a change in slope of said curve containing said desired point, said second means including means for storing a signal representative of the gradient of said curve being encountered in the generally linear portion thereof and for developing a signal indicative of having reached the desired point on the curve when said instantaneous gradient signal has a predetermined relationship relative to said stored signal.

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**4,110,830**

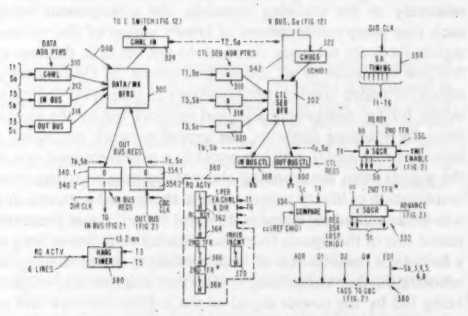
## CHANNEL STORAGE ADAPTER

**Matthew A. Krygowski, Wappingers Falls, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jul. 5, 1977, Ser. No. 813,408**

**Int. Cl.[2] G06F** *3/06;* **H04J** *3/00*

**U.S. Cl. 364—200** **6 Claims**




1. In association with an input/output processing subsystem of a data processing system and a storage access subsystem of said data processing system, said storage access subsystem including means for generating responses associated with storage access requests, and adapter for linking said subsystems comprising:

a buffer storage array;

first means for transferring fetch and store requests for access to said storage access subsystem from said input/output processing subsystem to said buffer storage array;

second means for transferring said requests from said array to said storage access subsystem;

third means for transferring responses associated with said requests from said storage access subsystem to said array;

fourth means for transferring said responses from said array to said input/output processing subsystem; and

sequence control means, coupled to said input/output subsystem and operating in a time division mode, for enabling concurrent operation of said first, second, third and fourth means on a time division basis for handling multiple requests and responses concurrently through said array; said sequence control means including means for providing maximum potential time adjacency between the operations of said first and second means relative to any request.

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**4,110,831**

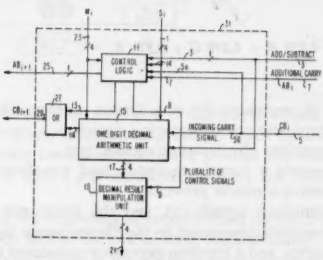
## METHOD AND MEANS FOR TRACKING DIGIT SIGNIFICANCE IN ARITHMETIC OPERATIONS EXECUTED ON DECIMAL COMPUTERS

**Glen George Langdon, Jr., San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jun. 29, 1977, Ser. No. 811,214**

**Int. Cl.[2] G06F** *7/50*

**U.S. Cl. 364—745** **5 Claims**




1. In combination with a multistage decimal adder/subtractor, an apparatus for rounding up the more precise one of two BCD encoded numbers to the least significant digit position of the less precise number, pairs of digits of like order being applied to corresponding stages, nonsignificant digits I being uniquely coded, said apparatus comprising:

means for comparing the significance of the digits of each pair and for causing the resultant digit of the corresponding adder/subtractor stage to be changed to I if at least one digit of the pair was of value I;

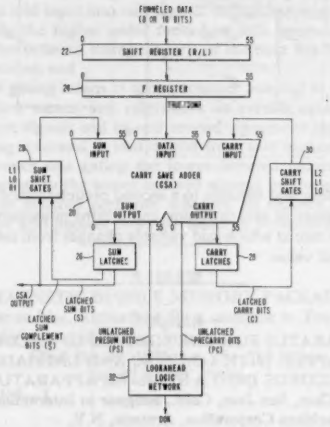
means for causing a first carry to be applied to the adder/subtractor stage next in higher order than a given stage when one digit of the pair applied to the given stage is significant and has a value $>b$, $b$ being sent by a rounding rule, the other digit having the value I; and

means for causing a second carry to be applied to the stage next in higher order than the given stage when the digit pair values and carries incident upon the given stage exceed an amount K and for causing the corresponding resultant digit to be changed to 0, said means including means also for generating a second carry in the event the given stage subtracts one digit from another and either the minuend digit has value I and the subtrahend digit $<b$ or the subtrahend digit has value I.

## 4,110,832
## CARRY SAVE ADDER

Joel Calvin Leininger, and George Phillips Taylor, both of Boca Raton, Fla., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 28, 1977, Ser. No. 792,082
Int. Cl.[2] G06F 7/50
U.S. Cl. 364—786 9 Claims




1. In an arithmetic processing apparatus which can perform various operations including addition and column shifting in response to control signals selectively applied thereto, said apparatus containing a source of gated clock pulses for timing such operations and a binary register for storing the bits of an operand to be used in certain of said operations,

a carry save adder for use in said apparatus comprising an ordered set of bit positions each capable of receiving at least three binary inputs and producing sum and carry output bits as logical functions thereof, each of said adder bit positions including as output elements thereof a pair of edge triggers which are respectively adapted to manifest sum and carry bits produced by the respective bit position,

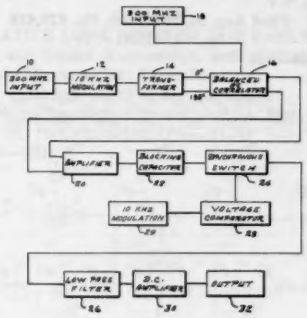
each of said triggers including a latch which is settable in response to adder inputs that coincide with a gated clock pulse and being capable of retaining such setting during the interval between successive clock pulses irrespective of input values that may be received by said adder during such interval, each latch thereby storing and manifesting as its output a clocked sum bit or a clocked carry bit as the case may be, and

input controls operable in response to applied control signals for conditioning each of said adder bit positions to receive inputs which include selected ones of the sum and carry bits manifested by the latches at the same adder bit position and/or another or others of said adder bit positions according to the particular operation selected by the applied control signal, the arrangement of said input controls being such that one of the output sum and carry bits manifested by the latches at the bit position in any given order of said ordered set is applied directly as input to a bit position in an adjacent order, if any, of the same ordered set, while the other of said output bits is applied directly as input to a bit position in an order, if any, which is adjacent to the first-mentioned adjacent order of said set, whereby the next subsequently applied clock pulse will cause the sum and carry latches of each adder bit position to be set in accordance with inputs then being applied to such bit position including one or more inputs from bit positions in the same ordered set.

## 4,110,833
## BALANCED AC CORRELATOR SYSTEM

Mark R. Williams, West Melbourne, and Gayle Patrick Martin, Indialantic, both of Fla., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 19, 1976, Ser. No. 743,361
Int. Cl.[2] G06G 7/19; H04B 1/12
U.S. Cl. 364—819 4 Claims

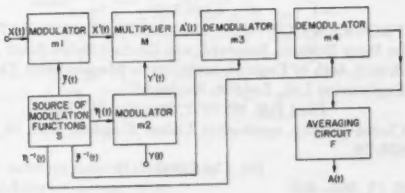



1. A balanced AC correlation system comprising: a first and second signal input means; modulator means connected to said first input means for modulating a signal; means connected to said modulator means for establishing two balanced signals; correlator means adapted to receive said balanced signals and said second input signal whereby said second input signal causes said balanced signals to vary in amplitude; amplifier means for amplifying the output of the correlator means; means for inhibiting the flow of a direct current signal from the amplifying means; switch means connected to the said means for inhibiting for causing a change in signal from AC to DC; filter means connected to the switch means for enhancing the quality of the DC signal, and means for amplifying the DC output signal.

## 4,110,834
## METHOD AND CIRCUIT ARRANGEMENT FOR THE MULTIPLICATION OF ELECTRICAL SIGNALS

Michael Altwein, Darmstadt, Fed. Rep. of Germany, assignor to Carl Schenck AG, Darmstadt, Fed. Rep. of Germany

Filed Jun. 13, 1977, Ser. No. 805,850
Claims priority, application Fed. Rep. of Germany, Jun. 19, 1976, 2627586
Int. Cl.[2] G06G 7/16
U.S. Cl. 364—841 19 Claims




1. A method for multiplying electrical signals comprising modulating each signal to be multiplied with a different modulation function, said modulation functions each having positive and negative values, multiplying said modulated signals together to form a product signal, demodulating said product signal of the modulated signals with demodulation functions which are the reciprocal of said modulation functions to pro-

duce a demodulated signal, and averaging said demodulated signal to produce an output signal.

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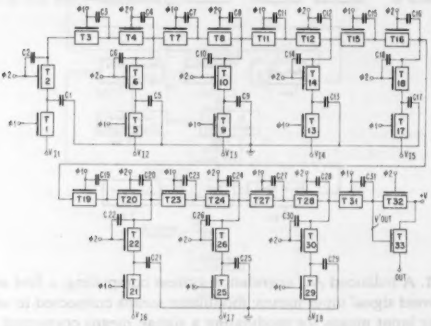
**4,110,835**

## BUCKET BRIGADE CIRCUIT FOR SIGNAL SCALING

**James F. Dubil, Warrenton, Va.; Howard N. Leighton, Rockville, Md., and Raymond J. Wilfinger, Lagrangeville, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Aug. 31, 1977, Ser. No. 829,418**
**Int. Cl.² G06G 7/16**
**U.S. Cl. 364—844** **2 Claims**



1. In a charge transfer device, a capacitive ratio multiplier which avoids DC bias offset, comprising:

a first input branch having a first characteristic capacitance, an input node and an output node, with a first signal having an information component to be multiplied and a DC bias component, being applied at its input node;

an output branch having a second characteristic capacitance with its input node connected to said output node of said first input branch, the ratio of said first characteristic capacitance to said second characteristic capacitance providing an information component multiplication of said first signal as it propagates from said first input branch to said output branch;

a second input branch having a third characteristic capacitance with its output node connected to said input node of said output branch, the sum of said first and third characteristic capacitances equalling said second characteristic capacitance, said second input branch having an input node with a DC bias component;

whereby if the DC bias components in said first and said second input branches are equal, then they will equal the DC bias component in said output branch.

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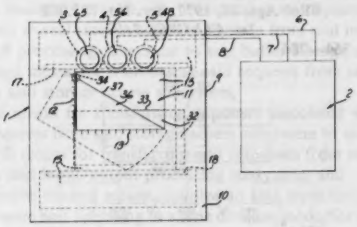
**4,110,836**

## PROGRAM CONTROL AND DISPLAY APPARATUS

**John Peter Bennett, Banstead, and Graham Robin Scott Jones, Bristol, both of England, assignors to Masson Scott Thrissell Engineering Ltd., London, England**

**Filed Feb. 10, 1977, Ser. No. 767,702**
**Claims priority, application United Kingdom, Feb. 19, 1976, 06689/76**
**Int. Cl.² G06G 7/16**
**U.S. Cl. 364—860** **5 Claims**

1. A program control and display apparatus for setting a plurality of values of a variable defining a program of operation for a controlled apparatus, comprising a display device adapted to display a graphic representation of said program, three setting devices, each comprising a variable potentiometer for a different one of three values of said variable, and for connection to the controlled apparatus so as to govern the respective value of said variable and means connected to said display device so as to produce a corresponding indication in said graphic representation, said potentiometers including a first potentiometer for setting said variable to a first predetermined value at one stage in said program, a second potentiometer for setting said variable to a second predetermined value at a further stage in said program, and a third potentiometer for setting the rate at which said variable changes from said first to said second value.



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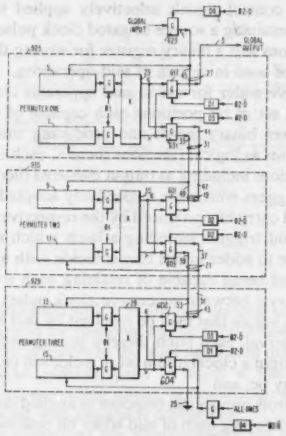
**4,110,837**

## APPARATUS FOR THE SORTING OF RECORDS OVERLAPPED WITH LOADING AND UNLOADING OF RECORDS INTO A STORAGE APPARATUS

**Tien Chi Chen, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 30, 1976, Ser. No. 755,910**
**Int. Cl.² G06F 7/24**
**U.S. Cl. 364—900** **4 Claims**



2. A sorting apparatus comprising:

an ordered plurality of permuters each permuter including higher and lower ordered storage means for storing information records having ordering indicia associated therewith, each permuter further including comparison means coupled to said storage means for comparing the relative magnitude of the ordering indicia of said records and generating output signals indicating the relative order of said ordering indicia whereby each record of a pair of records is ascribed a relative order,

the higher ordered storage means of a given permuter coupled to the lower ordered storage means of the next higher ordered permuters and the lower ordered storage means of said given permuter coupled to the higher ordered storage means of the next lower ordered permuter;

an input terminal coupled to the highest ordered permuter

and an output terminal coupled to said highest ordered permuter;

timing means coupled to said permuters for sequentially generating a first set of signals ($\phi 2 \cdot D$) indicative of an input mode of operation and second set of signals ($\phi 2 \cdot \overline{D}$) indicative of an output mode of operation;

first gating means in each permuter coupled to said comparison means and responsive to certain of said output signals and to said first signals for sequentially gating a record from said input into said highest ordered permuter and for gating the higher order record in each permuter to said higher ordered storage means of the next lower ordered permuter; and

second gating means in each permuter coupled to said comparison means and responsive to certain other of said output signals and to said second signals for sequentially gating a record to said output from said highest ordered permuter and gating the lower ordered record in each permuter to the lower ordered storage means of the next higher ordered permuter whereby all records are gated out of said highest order permuter in sorted order.

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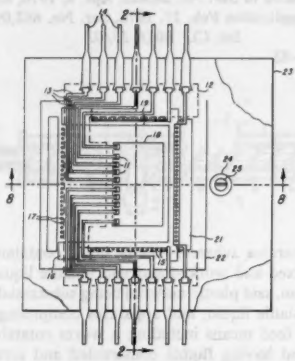
**4,110,838**

## MAGNETIC BUBBLE MEMORY PACKAGE

**Terry Wayne Noe, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Jul. 30, 1976, Ser. No. 710,763**
**Int. Cl.[2] G11C *19/08***
**U.S. Cl. 365—2** **7 Claims**



1. In a packaging assembly for magnetic bubble domain chips, the combination comprising:

a film of insulating material having a pattern of metal conductors disposed thereon, said film of insulating material comprising a pair of parallel arm extensions and a cross member extending between said arm extensions at one end thereof and connecting said arm extensions,

magnetic bubble domain chip means in mechanical and electrical contact with said film of insulating material and said metal conductors disposed thereon,

a coil carrier member of non-conductive material, said coil carrier member having parallel side walls and top and bottom plates defining an enclosure therewithin in which said magnetic bubble domain chip means is received,

said parallel side walls of said coil carrier member being respectively provided with guide slots disposed in substantially parallel relation with respect to said top and bottom plates,

said film of insulating material being mounted externally of said coil carrier member with said arm extensions being respectively received by the guide slots in the side walls of said coil carrier member,

at least some of said metal conductors on said film of insulating material extending into the enclosure defined by said coil carrier member at one end thereof and into electrical contact with said magnetic bubble domain chip means, and

first and second magnetic field coils wound about said coil carrier member in orthogonal relationship with respect to each other and operable to produce an in-plane rotary magnetic field at the surface of said magnetic bubble domain chip means in response to electrical energization thereof.

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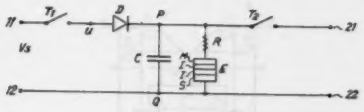
**4,110,839**

## NON-VOLATILE LONG MEMORY FOR FAST SIGNALS

**Alain Bert, and Gerard Kantorowicz, both of Paris, France, assignors to Thomson-CSF, Paris, France**

**Filed Sep. 20, 1977, Ser. No. 835,010**
**Claims priority, application France, Sep. 24, 1976, 76 28765**
**Int. Cl.[2] G11C *13/00, 11/40***
**U.S. Cl. 365—180** **19 Claims**



1. A non-volatile, long memory for fast signals, comprising at least a first storage stage, comprising a capacitor (C) with two terminals (P and Q) and a diode (D) having two terminals (U and P); a second storage stage with an MIIS element (E); means for storing said fast signal in said first stage by the accumulation of a quantity of electric charges which are a function of said fast signal during a time at least equal to the time for storing a signal in said second stage, said storage in said second stage being done by means of the accumulation at least of a fraction of said quantity of charges at the terminals of the MIIS element.

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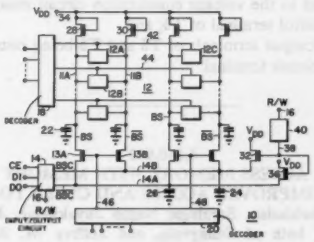
**4,110,840**

## SENSE LINE CHARGING SYSTEM FOR RANDOM ACCESS MEMORY

**Kichio Abe, Yokohama, Japan, and William L. Martino, Jr., Austin, Tex., assignors to Motorola Inc., Schaumburg, Ill.**

**Filed Dec. 22, 1976, Ser. No. 753,235**
**Int. Cl.[2] G11C *7/00***
**U.S. Cl. 365—203** **6 Claims**



1. A memory system comprising:

a plurality of storage cells:

first and second sense-write conductors coupled to a plurality of said storage cells for writing information into and sensing information out of a selected one of said storage cells;

first means coupled to said storage cells for selecting one of said storage cells;

read/write means coupled to said first and second sense-write conductors responsive to a read/write input of said

memory system for controlling reading and writing operations in said memory system; and

means responsive to said read/write input coupled to said first and second sense-write conductors for charging said first and second sense-write conductors to substantially equal voltages in response to a transition of said read/write input prior to sensing one of said storage cells.

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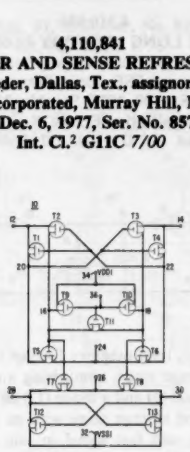
## 4,110,841

## LEVEL SHIFTER AND SENSE REFRESH DETECTOR

**Paul Robert Schroeder, Dallas, Tex., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Dec. 6, 1977, Ser. No. 857,935**
**Int. Cl.[2] G11C *7/00***
**U.S. Cl. 365—205** **7 Claims**



1. Circuit means comprising:

first, second, third, fourth, fifth, and sixth switching devices (T1, T2, T3, T4, T5, and T6) which each comprise a control terminal and first and second output terminals;

voltage equalization circuit means;

the first output terminals of T1 and T2 being coupled together to a first input circuit terminal, the control terminals of T1 and T2 being coupled together to the second output terminals of T4 and T6, the second output terminal of T2 being coupled to the control terminal of T5 and to the voltage equalization circuit means;

the first output terminals of T3 and T4 being coupled together to a second circuit terminal, the control terminals of T3 and T4 being coupled to the second output terminals of T1 and T5, the second output terminal of T3 being coupled to the voltage equalization circuit means and to the control terminal of T6; and

the first output terminals of T5 and T6 being coupled to a third circuit terminal.

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## 4,110,842

## RANDOM ACCESS MEMORY WITH MEMORY STATUS FOR IMPROVED ACCESS AND CYCLE TIMES

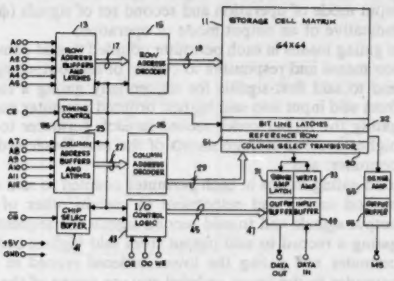
**Vahe A. Sarkissian, Saratoga; Nagab Jayakumar; Joseph H. Kroeger, both of Sunnyvale, and Jeffrey M. Schlageter, Saratoga, all of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.**

**Filed Nov. 15, 1976, Ser. No. 741,971**
**Int. Cl.[2] G11C *7/04***
**U.S. Cl. 365—233** **11 Claims**

5. The method of providing a memory status signal in semiconductor random access chip memories of the type having rows and columns of data bit storage cells comprising,

providing a reference row of cells in a static random access memory in parallel with rows of data bit storage cells, said reference row of cells matched in performance to said other rows,

propagating a signal derived from a chip enable signal through said reference row,



receiving the propagated signal through said reference row and forming a memory status signal therefrom indicating data availability for reading.

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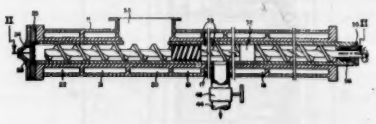
## 4,110,843

## PRESSURE RESTRICTING MEANS FOR A LIQUID OUTLET OF AN EXTRUDER

**Richard H. Skidmore, Strafford, Pa., assignor to Welding Engineers, Inc., King of Prussia, Pa.**

**Continuation of Ser. No. 335,059, Feb. 23, 1973, abandoned, which is a division of Ser. No. 26,622, Apr. 8, 1970, abandoned. This application Feb. 27, 1976, Ser. No. 662,095**
**Int. Cl.[2] B01F *15/02***
**U.S. Cl. 366—83** **2 Claims**



1. In an apparatus, wherein volatile liquid-containing plastic material is mixed and worked and said volatile liquid is separated therefrom, said plastic material being substantially insoluble in said volatile liquid, said apparatus comprising an elongated barrel, feed means including a worm rotatable within said barrel and having flights constructed and arranged for mixing, working, heating and conveying said mixture and separating said liquid therefrom, upstream restrictor means connected to and rotating with said worm means, downstream restrictor means connected to and rotating with said worm means at a location spaced downstream of said upstream restrictor means for providing a high pressure region in the mixture between said upstream restrictor means and said downstream restrictor means, said liquid having the property of volatilizing at the temperature at which said material is treated, but having the property of remaining in the liquid state at said temperature and pressure existing in said high pressure region, means associated with said worm means for forming a feed section spaced upstream from said high pressure region, inlet means for said liquid-containing material in said region of lower pressure upstream of said high pressure region, a high pressure liquid outlet extending from the inside to the outside of said barrel located in said high pressure region for removing from said barrel a significant portion of said liquid separated under said high pressure from said mixture, conveying means associated with said worm means and positioned downstream of said high pressure region for conveying said mixture, and pressure restricting means connected to said liquid outlet for maintaining said separated liquid removed from said high pressure region at a pressure lower than that in said high pressure region but sufficiently high to prevent vaporization of said

liquid in said barrel, and for removing said separated liquid from said barrel while in the liquid state.

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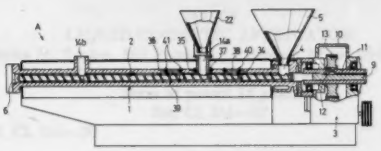
**4,110,844**

## VENT TYPE EXTRUDER

**Kensaku Nakamura, 272-1, Bessho-Cho, Matsubara-Shi, Osaka, Japan (580)**

**Filed May 16, 1977, Ser. No. 797,388**
**Int. Cl.[2] B29B *1/06***
**U.S. Cl. 366—76** **6 Claims**

1. A vent type extruder comprising a raw material feeding port in a heating cylinder and provided on the uppermost edge portion thereof with a hopper means, said heating cylinder being provided in the foremost end thereof with an extruding mouth, a rotatable extruding screw in said heating cylinder, and means defining a vent on said heating cylinder adjacent to said extruding screw and venting-casting port means in a portion of said cylinder positioned between said vent and said raw material feeding port, said venting-casting port means being positioned and arranged on said cylinder whereby additional material may be introduced into said cylinder at selected positions axially thereof, depending upon the kind of materials to be cast into the cylinder, said venting-casting port being provided on the upper portion thereof with auxiliary hopper means.



# DESIGNS

## AUGUST 29, 1978

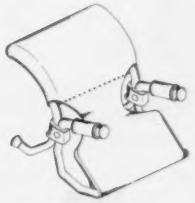
**249,096**
**BATHING SUIT**
Catalina Fowler, 2828 Bellwood Ave., Brandon, Fla. 33511
Filed Jul. 12, 1976, Ser. No. 704,430
Term of patent 14 years
Int. Cl. D2—*07*
U.S. Cl. D2—40

**249,097**
**CONVERTIBLE SKIRT AND SHORT PANTS GARMENT OR THE LIKE**
Sarah E. Rahaim, 3300 Atlantic Blvd., Jacksonville, Fla. 32207
Filed Mar. 1, 1976, Ser. No. 662,351
Term of patent 14 years
Int. Cl. D2—*02*
U.S. Cl. D2—28

**249,098**
**SHOE CLOSURE DEVICE**
Thomas D. Nickerson, and Edwin L. Lombard, both of Meadville, Pa., assignors to Textron Inc., Providence, R.I.
Filed Jun. 28, 1976, Ser. No. 700,661
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—315

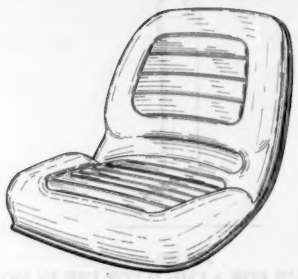
**249,099**
**LIQUID COSMETIC APPLICATOR**
Charles H. Taylor, 165 Front St., Chicopee, Mass. 01013
Filed Oct. 29, 1976, Ser. No. 737,081
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D4—20

**249,100**
**SAFETY CHAIR FOR A CHILD FOR USE IN MOTOR VEHICLES**
Kunio Nanba, and Taro Ogawa, both of Kurashiki, Japan, assignors to Namba Press Yogyo Kabushiki Kaisha, Kurashiki, Japan
Filed Sep. 17, 1976, Ser. No. 724,358
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—9



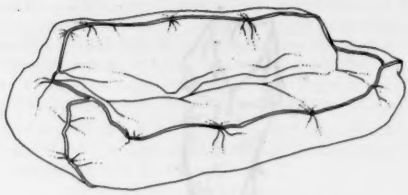
**249,101**
**JEWELRY DISPLAY STAND**
Rose L. Struble, 3298 Montieth Ave., Cincinnati, Ohio 45208, and Adele S. Katz, 8770 Arborcrest, Cincinnati, Ohio 45236
Filed Sep. 2, 1976, Ser. No. 719,786
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—20

249,102
VEHICLE SEAT
Charles W. Pelly, Calabasas, Calif., assignor to Sears Manufacturing Company, Davenport, Iowa
Filed Sep. 17, 1976, Ser. No. 724,163
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—48

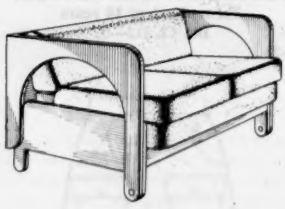


249,103
CHAIR
Sergio Rodriguez, Chihuahua, Mexico, assignor to Nortexport, S.A. de C.V.
Filed Sep. 13, 1976, Ser. No. 723,183
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—55

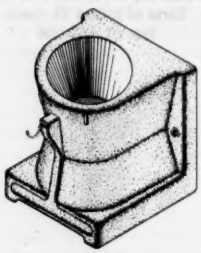
249,104
SOFA
Rodney R. Haynes, Sr., Richmond, Va., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Sep. 7, 1976, Ser. No. 720,545
The portion of the term of this patent subsequent to May 3, 1991, has been disclaimed.
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—63



249,105
CONVERTIBLE SEAT
Giuseppe Infanti, Calle La Guaira, Ed. Piaroa - Piso 10, Apto. 101, Las Palmas, Caracas, Venezuela
Division of Ser. No. 707,467, Jul. 21, 1976. This application Aug. 31, 1977, Ser. No. 829,429
Term of patent 14 years
Int. Cl. D6—*05*
U.S. Cl. D6—64

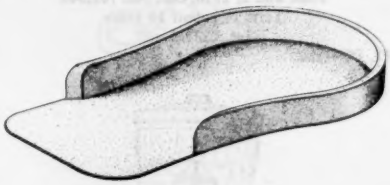


249,106
COMBINED SPRAY CAN HOLDER AND SWITCH FOR AN AIR FILTERING SYSTEM
Dominic J. Zimbardi, 122 Thompson Ave., and Teddar S. Brooks, 207 Court St., both of Little Valley, N.Y. 14755
Filed Sep. 29, 1976, Ser. No. 727,420
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—86

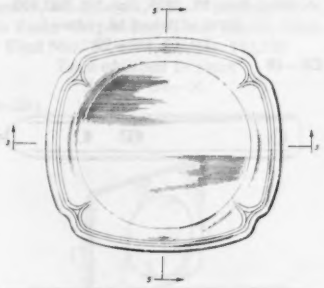


249,107
TABLE
Sergio Rodriguez, Chihuahua, Mexico, assignor to Nortexport, S.A. de C.V.
Filed Sep. 13, 1976, Ser. No. 723,184
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—146

249,108
TABLE TRAY ATTACHMENT
Thomas C. Cannon, Jr., 5244 Lake Springs Dr., Dunwoody, Ga. 30338
Filed Sep. 17, 1976, Ser. No. 724,597
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—199



249,109
DINNER PLATE OR SIMILAR ARTICLE
George B. Jensen, Syracuse, N.Y., assignor to Syracuse China Corp., Syracuse, N.Y.
Filed Sep. 15, 1976, Ser. No. 723,526
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—1

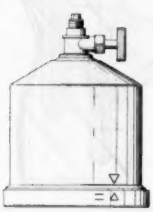


249,110
CUP FOR ADMINISTERING MEDICINE OR THE LIKE
Edward H. Newmark, 2 Grove St., New York, N.Y. 10014
Filed Aug. 22, 1977, Ser. No. 826,875
Term of patent 14 years
Int. Cl.[2] D7—*01*
U.S. Cl. D7—6

249,111
BEVERAGE TUMBLER
Gary Geyer, New York, N.Y., assignor to The Coca-Cola Company
Filed Jun. 18, 1976, Ser. No. 697,607
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—15

249,112
CAKE MOLD
Howard P. Garson, 15211 Preston Rd., Apt. 2004, Dallas, Tex. 75240, and Henry J. Crowley, 3941 Circle Bluff Ct., Dallas, Tex. 75234
Filed Aug. 25, 1976, Ser. No. 717,864
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—43

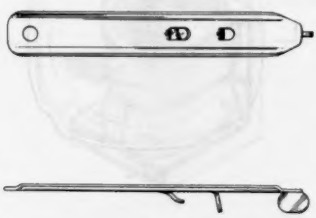
249,113
BASE FOR A CAMP STOVE
William Albert Folke, Upplands Vasby, Sweden, assignor to Aktiebolaget Optimus, Upplands Vasby, Sweden
Division of Ser. No. 555,252, Mar. 4, 1975, Pat. No. Des. 244,985. This application Nov. 18, 1976, Ser. No. 742,865
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—110



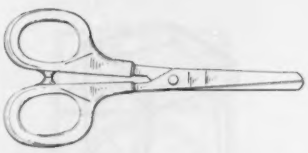
249,114
ARTICLE OF FLATWARE
William J. Knope, and Frank K. Guodace, both of Meriden, Conn., assignors to International Silver Company, Meriden, Conn.
Filed May 3, 1976, Ser. No. 682,367
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

249,115
GARBAGE CAN OR SIMILAR ARTICLE
Robert D. Waldron, Sandusky, Ohio, assignor to Sandusky City-Erie County Department of Health, Sandusky, Ohio
Filed Jul. 1, 1976, Ser. No. 701,546
Term of patent 14 years
Int. Cl. D7—*07*
U.S. Cl. D7—192

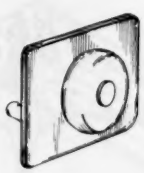
249,116
CAN OPENER FOR OPENING DUAL APERTURE POP-TOP CANS
Clement J. Vanderbloemen, 2431 W. Butler Dr., Phoenix, Ariz. 85021
Filed Nov. 18, 1976, Ser. No. 742,838
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D8—18



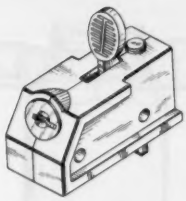
249,117
SCISSORS
Olof Bäckström, Tammisaari, Finland, assignor to Oy Fiskars AB, Helsinki, Finland
Filed Apr. 6, 1976, Ser. No. 674,248
Claims priority, application Finland, Mar. 16, 1976, 76138
The portion of the term of this patent subsequent to Nov. 23, 1990, has been disclaimed.
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—57



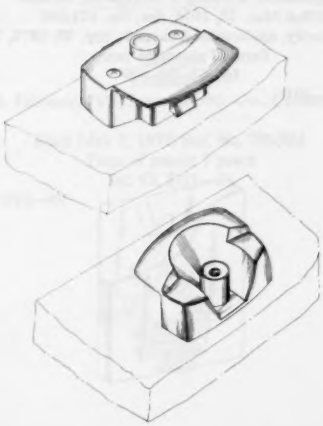
249,118
COMBINED FURNITURE PULL AND ESCUTCHEON
Emil J. Bocade, 135 Lemyra, SE., Wyoming, Mich. 49508, assignor to Keeler Corporation, Grand Rapids, Mich.
Filed Nov. 16, 1976, Ser. No. 742,330
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—301



249,119
DOOR OR WINDOW LOCK
Howard Byron Gorton, San Gabriel, Calif., assignor to Ajax Hardware Corporation, City of Industry, Calif.
Filed Nov. 10, 1976, Ser. No. 740,362
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—341

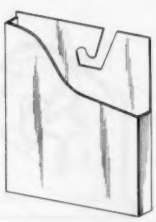


249,120
DOOR LATCH
Torsti T. T. Jerila, Rowland Heights, Calif., assignor to Acme General Corporation
Filed Feb. 14, 1977, Ser. No. 768,215
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—341

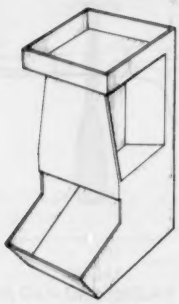


249,121
JAR
Gordon A. Strand, Toledo, Ohio, assignor to Owens-Illinois, Inc.
Filed Aug. 30, 1976, Ser. No. 719,205
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—101

249,122
HOLDER FOR HANGING STOCKINGS AND SOCKS
Sturlaugur Bjornsson, Karastig 9, Reykjavik, Iceland
Filed Mar. 29, 1976, Ser. No. 671,440
Claims priority, application Denmark, Sep. 30, 1975, 765/75
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—191



249,123
DISPLAY CARTON
Amilcare Dogliotti, Neive (Cuneo), Italy, assignor to P. Ferrero & C. S.p.A., Alba (Cuneo), Italy
Filed Jul. 15, 1976, Ser. No. 705,496
Claims priority, application Italy, Jan. 26, 1976, 52881 B/76
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—224



249,124
STUD CHECKER TOOL
Gustave Albert Oberg, Jackson, Tenn., assignor to The Bendix Corporation, Southfield, Mich.
Filed Sep. 15, 1976, Ser. No. 723,382
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—64

249,125

**AUTOMATIC PILL REMINDER OR SIMILAR ARTICLE**

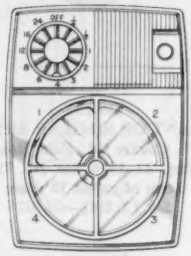
Irvin E. Wright, Temecula, and Robert O. Magnussen, Jr., Walnut, both of Calif., assignors to Caltime Products Corp., Temecula, Calif.

Filed Apr. 29, 1976, Ser. No. 681,607

Term of patent 14 years

Int. Cl. D10—*04*

U.S. Cl. D10—40



249,126

**FOOD PROBE HANDLE**

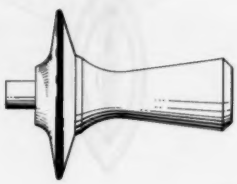
Martin H. Pitstick, Cleves, Ohio, and Charles H. Schmitt, Louisville, Ky., assignors to General Electric Company

Filed Oct. 26, 1976, Ser. No. 735,374

Term of patent 14 years

Int. Cl. D10—*04*

U.S. Cl. D10—60



249,127

**INSIDE MICROMETER**

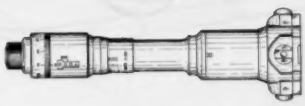
Takeshi Yamamoto, Kawasaki, Japan, assignor to Mitutoyo Manufacturing Company, Ltd., Tokyo, Japan

Filed Oct. 18, 1976, Ser. No. 733,481

Term of patent 14 years

Int. Cl. D10—*04*

U.S. Cl. D10—73



249,128

**MEASURING TAPE REEL HOLDER**

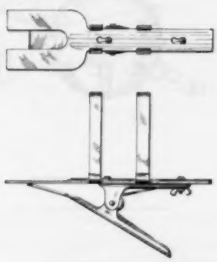
David M. Stookey, 408 Oak Grove Cir., Anaheim, Calif. 92807

Filed Jul. 2, 1976, Ser. No. 702,224

Term of patent 14 years

Int. Cl. D10—*04*

U.S. Cl. D10—74



249,129

**EARRING**

Martin B. Fishman, 765 Massachusetts Ave., Cambridge, Mass. 02139

Filed May 5, 1977, Ser. No. 793,963

Term of patent 7 years

Int. Cl. D11—*01*

U.S. Cl. D11—48

249,130
EARRING
Martin B. Fishman, 765 Massachusetts Ave., Cambridge, Mass. 02139
Filed May 5, 1977, Ser. No. 793,962
Term of patent 7 years
Int. Cl. D11—*01*
U.S. Cl. D11—62

249,131
PENDANT OR SIMILAR ARTICLE
Josef J. Barr, 293 S. County Rd., Palm Beach, Fla. 33480
Filed Sep. 22, 1976, Ser. No. 725,472
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—81

249,132
PENDANT OR SIMILAR ARTICLE
Josef J. Barr, 293 S. County Rd., Palm Beach, Fla. 33480
Filed Sep. 22, 1976, Ser. No. 725,473
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—81

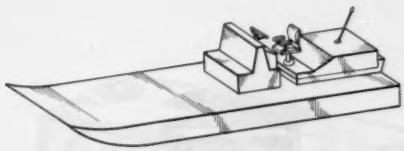
249,133
PENDANT OR SIMILAR ARTICLE
Josef J. Barr, 293 S. County Rd., Palm Beach, Fla. 33480
Filed Sep. 22, 1976, Ser. No. 725,475
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—81

249,134
PENDANT OR SIMILAR ARTICLE
Josef J. Barr, 293 S. County Rd., Palm Beach, Fla. 33480
Filed Sep. 22, 1976, Ser. No. 725,476
Term of patent 14 years
Int. Cl. D11—*01, 05*
U.S. Cl. D11—81

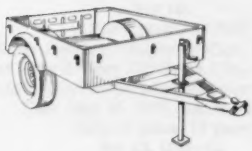
249,135
PENDANT OR SIMILAR ARTICLE
Josef J. Barr, 293 S. County Rd., Palm Beach, Fla. 33480
Filed Sep. 22, 1976, Ser. No. 725,477
Term of patent 14 years
Int. Cl. D11—*01, 05*
U.S. Cl. D11—81

249,136
EMBLEM
John O. McElroy, Jr., 1859 Kepler Rd., Pottstown, Pa. 19464
Filed Nov. 1, 1976, Ser. No. 737,857
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—105

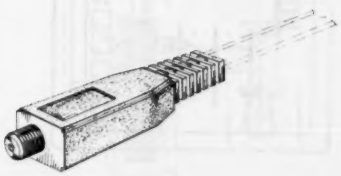
249,137
SHALLOW WATER CRAFT
Charles F. Hoyt, P.O. Box 638, Katy, Tex. 77450
Filed Feb. 25, 1976, Ser. No. 661,364
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—62



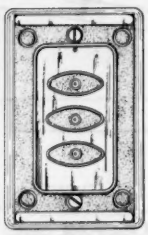
249,138
UTILITY TRAILER
Jimmie L. Butler, P.O. Box 486, Kingman, Ariz. 86401
Filed Nov. 12, 1976, Ser. No. 741,198
Term of patent 14 years
Int. Cl. D12—*10*
U.S. Cl. D12—105



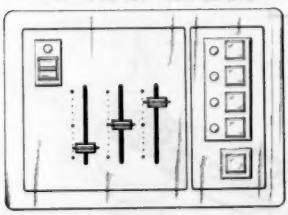
249,139
MATCHING TRANSFORMER
Jing-Jong Lin, Tai Chung, Taiwan, assignor to Fulet Enterprise Co., Ltd., Taipei Hsien, Taiwan
Filed Sep. 13, 1976, Ser. No. 722,373
Term of patent 14 years
Int. Cl. D13—*02;* D14—*03*
U.S. Cl. D13—4



249,140
PUSH BUTTON CONTROL STATION
Neil J. Driscoll, 20980 Castanso St., Woodland Hills, Calif. 91364
Continuation-in-part of Ser. No. 509,714, Sep. 26, 1974, abandoned. This application May 7, 1976, Ser. No. 684,091
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—32

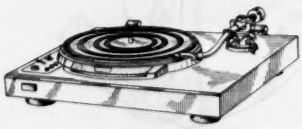


249,141
REMOTE DIMMING CONTROL
Noel Mayo, Philadelphia, Pa., assignor to Lutron Electronics Co., Inc., Coopersburg, Pa.
Filed Sep. 27, 1976, Ser. No. 726,524
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—32

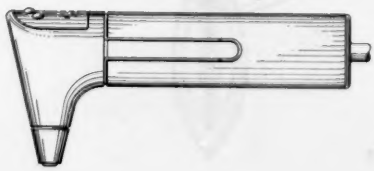


249,142
COMBINED PORTABLE CASSETTE RECORDER AND RADIO
Takao Okada, Kyoto; Tsutomu Murakami, Neyagawa, and Hironosuke Koda, Kyoto, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed Jun. 18, 1976, Ser. No. 697,658
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—5

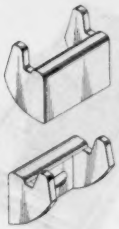
249,143
RECORD PLAYER
Kazuhito Ohtomo, Tokyo, Japan, assignor to Sansui Electric Co., Ltd., Tokyo, Japan
Filed Jun. 16, 1976, Ser. No. 696,660
Claims priority, application Japan, Dec. 19, 1975, 50-50263
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—17



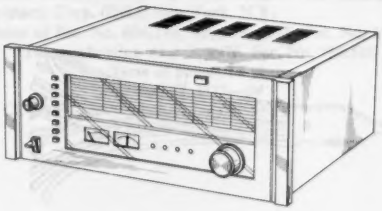
249,144
SCANNER UNIT
Charles Dennis Flanigan, San Jose, Calif.; Randall John Mazzei, Boise, Id., and Howard Strudwick Noel, Los Gatos, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Apr. 6, 1977, Ser. No. 785,160
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—40



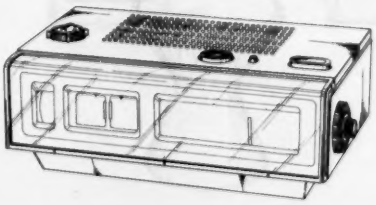
249,145
TELEPHONE ACCESSORY ADAPTER
Paul H. Landau, and Harolyn S. Landau, both of 8632 W. Olympic Blvd., Los Angeles, Calif. 90035
Filed Nov. 8, 1976, Ser. No. 740,045
Term of patent 14 years
Int. Cl. D14—*03, 99*
U.S. Cl. D14—59



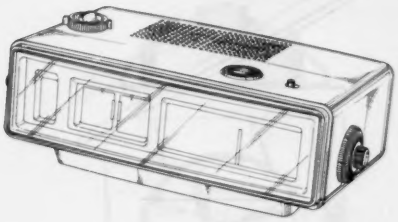
249,146
TUNER
Hiroshi Tabata, Tokyo, Japan, assignor to Sansui Electric Co., Ltd., Tokyo, Japan
Filed Jun. 30, 1976, Ser. No. 701,278
Claims priority, application Japan, Apr. 5, 1976, 51-12386
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—71



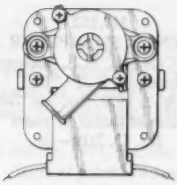
249,147
DIGITAL CLOCK RADIO
Isshin Miyamoto, Fukuoka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed Jul. 22, 1976, Ser. No. 707,800
Claims priority, application Japan, Feb. 9, 1976, 51-4108
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—73

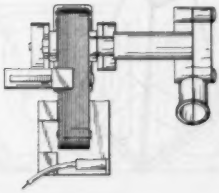


249,148
DIGITAL CLOCK RADIO
Isshin Miyamoto, Fukuoka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed Jul. 22, 1976, Ser. No. 707,928
Claims priority, application Japan, Feb. 9, 1976, 51-4107
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—73



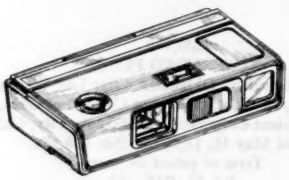
249,149
SUSPENDED PUMP
Kenneth Lynn Doughty, Oklahoma City; Lee W. Davis, Del City, and Gary R. Yost, Oklahoma City, all of Okla., assignors to Little Giant Corporation, Oklahoma City, Okla.
Filed May 16, 1975, Ser. No. 578,156
Term of patent 14 years
Int. Cl. D15—*02*
U.S. Cl. D15—7





249,150
CUTTER PIN FOR MOWER
Joseph E. Scanland, Savannah, Ga., and Gerald C. Fisher, Shelby, Ohio, assignors to Roper Corporation, Kankakee, Ill.
Filed Oct. 29, 1976, Ser. No. 736,846
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D15—17

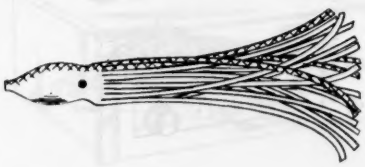
249,151
STILL CAMERA OR SIMILAR ARTICLE
Samuel Franklin Swayze, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Jan. 21, 1977, Ser. No. 761,154
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—06



249,152
PENCIL SHARPENER
William Macowski, Caldwell, N.J., assignor to Ketcham & McDougall, Inc., Roseland, N.J.
Filed Feb. 7, 1977, Ser. No. 766,226
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—73

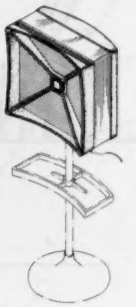
249,153
TELEPHONE LIST FINDER
Martin Glaubinger, Teaneck, N.J., and John Wilson, Upper Nyack, N.Y., assignors to Rolodex Corporation
Filed Nov. 10, 1975, Ser. No. 630,334
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D19—76

249,154
LURE
June Furukawa, 9640 Desmond Rd., Richmond, British Columbia, Canada (V7E 1R2)
Filed Feb. 10, 1977, Ser. No. 767,560
Claims priority, application Canada, Aug. 25, 1976, 2508762
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27

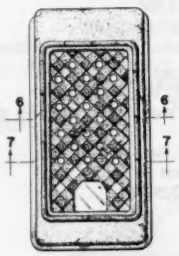


249,155
FAUCET HANDLE
Donald W. Doman, Janesville, Wis., assignor to Kohler Co.
Filed Mar. 21, 1977, Ser. No. 779,923
Term of patent 14 years
Int. Cl. D23—*01*; D8—*06*
U.S. Cl. D23—28

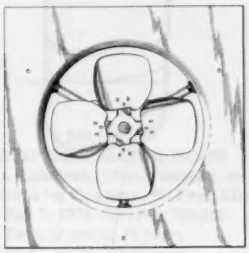
249,156
COMBINED FAN AND FILTER FOR AN AIR FILTERING SYSTEM
Dominic J. Zimbardi, 122 Thompson Ave., and Teddar S. Brooks, 207 Court St., both of Little Valley, N.Y. 14755
Filed Sep. 29, 1976, Ser. No. 727,419
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—140



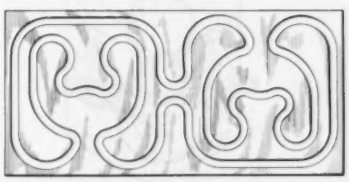
249,157
DEODORANT CONTAINER OR THE LIKE
Raymond P. Stoy, Westport, Conn., assignor to American Home Products Corp. (Del.), New York, N.Y.
Division of Ser. No. 604,288, Aug. 13, 1975, Pat. No. 242,460.
This application Aug. 2, 1976, Ser. No. 710,515
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—150



249,158
ATTIC VENTILATOR
William B. Morrow, P.O. Box N-4, Winston-Salem, N.C. 27105, assignor to Aqua-Mist, Inc., Winston-Salem, N.C.
Filed May 10, 1976, Ser. No. 684,863
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—158

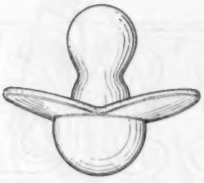


249,159
MODULAR TRACK ASSEMBLY FOR A 200-UNIT BIOLOGICAL SAMPLE CHANGER
Anthony A. Mueller, Florence, Ky., assignor to Actus, Inc., Florence, Ky.
Filed Jul. 12, 1977, Ser. No. 815,007
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—7

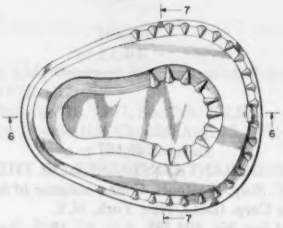


249,160
FACE MASSAGER
Hiroshi Toyoda, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Nov. 19, 1976, Ser. No. 743,255
Claims priority, application Japan, May 20, 1976, 51-187610
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D24—36

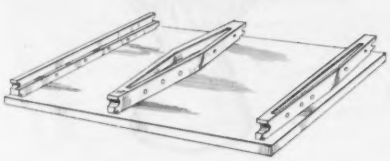
249,161
INFANT PACIFIER
Peter Röhrig, Fabriksgelande 1, A-7201 Neudorfl, Austria
Filed Jun. 17, 1976, Ser. No. 697,160
Claims priority, application Austria, Dec. 22, 1975, 505439; Dec. 22, 1975, 505440; Dec. 22, 1975, 505441; Dec. 22, 1975, 505442; Dec. 22, 1975, 505443; Dec. 22, 1975, 505444; Dec. 22, 1975, 505445
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D24—45



249,162
DISPOSABLE BEDPAN
Kenneth Wilson Mills, Bolton, England, assignor to Vernon & Co. (Pulp Products) Ltd., England
Filed Apr. 1, 1976, Ser. No. 672,685
Claims priority, application United Kingdom, Aug. 2, 1975, 972059/75
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D24—57



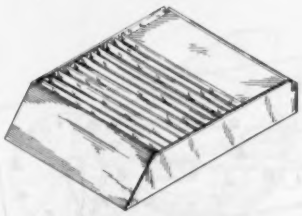

249,163
INTERLOCKING WALL UNIT
Milton A. Wallace, Bell Haven Park, 3200 NW. 79th St., Apt. 1925, Miami, Fla. 33147
Filed Jun. 28, 1976, Ser. No. 700,718
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—80



249,164
SWIMMING POOL FORM
Paul E. Grant, 2625 SE. Bonita St., Stuart, Fla. 33494
Filed Aug. 19, 1976, Ser. No. 715,913
Term of patent 14 years
Int. Cl. D25—*99*
U.S. Cl. D25—98

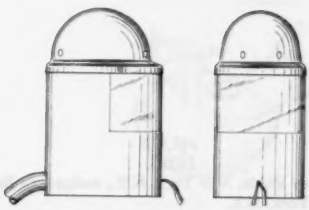
249,165
LIGHTER FOR SMOKERS
Lars-Erik Hallden, Geneva, Switzerland, assignor to Interfeudor S.A., Geneva, Switzerland
Filed Dec. 8, 1976, Ser. No. 749,032
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42

249,166
SEED SEPARATOR
Arthur Strathman, 701 W. Hampden, Englewood, Colo. 80110
Filed Jan. 10, 1977, Ser. No. 757,941
Term of patent 14 years
Int. Cl. D27—*99*
U.S. Cl. D27—51

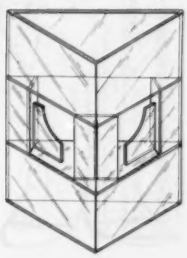


249,167
FINGERNAIL FILE
Peggy L. Hovda, and Paul F. Hauptman, both of Lakewood, Colo., assignors to Unique Industries, Inc., Lakewood, Colo.
Filed Oct. 18, 1976, Ser. No. 733,511
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—57

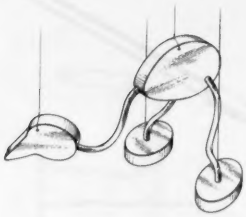
249,168
SOFTCAP RESPIRATOR HOOD
Lawrence A. Sweet, Lakeland, Minn., assignor to Minnesota Mining & Manufacturing Company, St. Paul, Minn.
Filed Jul. 7, 1976, Ser. No. 703,211
Term of patent 14 years
Int. Cl. D29—*02;* D2—*03*
U.S. Cl. D29—7



249,169
AQUARIUM TANK
Gentle James Walker, Detroit, Mich., assignor to Paul C. Harvey, a part interest
Filed Apr. 18, 1977, Ser. No. 788,631
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—6



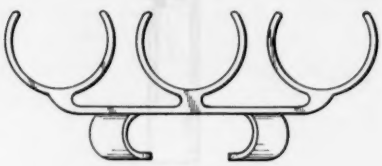
249,170
PUPPET BIRD
Irvin Enns, 8800 W. Virginia Ave., Lakewood, Colo. 80226
Filed Jul. 26, 1976, Ser. No. 708,764
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—2 A



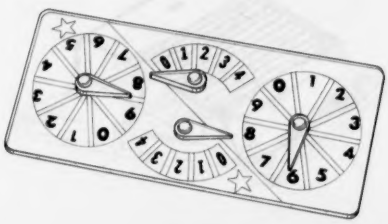
249,171
DOLL
Suzann Audrey Rubin, New York, N.Y., assignor to Be A Doll, Inc., New York, N.Y.
Filed Nov. 16, 1976, Ser. No. 742,509
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—4 R

249,172
WHEEL GUIDE
Dale E. Upshaw, 1669 Ham Ave., Santa Clara, Calif. 95051
Filed May 11, 1976, Ser. No. 685,439
Term of patent 7 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 HP

249,173
HOLDER FOR ATTACHING TO A TENNIS RACKET OR SIMILAR ARTICLE
David L. Coleman, 7341 Freeman Pl., Goleta, Calif. 93017
Filed Jul. 14, 1976, Ser. No. 705,001
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 ST

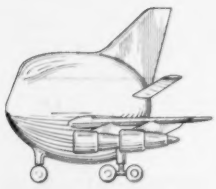


249,174
GAME COUNTER
Donald E. Meredith, 539 E. Washington St., Dimondale, Mich. 48821
Filed Dec. 8, 1976, Ser. No. 748,568
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 MM

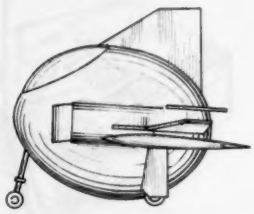


249,175
SKATE GUARD
Jan Fardigs, Leksand, Sweden, assignor to Joons Plastprodukter, Leksand, Sweden
Filed Aug. 3, 1976, Ser. No. 711,380
Claims priority, application Sweden, Feb. 25, 1976, 76-0444
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—14 B

249,176
TOY AIRPLANE
James F. Loomis, Seattle, Wash., assignor to Industrial Promotional Toys, Inc.
Filed Nov. 28, 1975, Ser. No. 635,973
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 HH

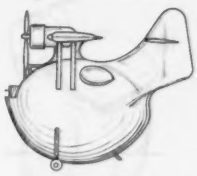


249,177
TOY AIRPLANE
James F. Loomis, Seattle, Wash., assignor to Industrial Promotional Toys, Inc.
Filed Jan. 21, 1976, Ser. No. 651,023
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 HH

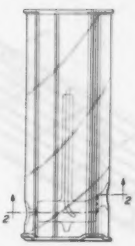


249,178
TOY AIRPLANE
James F. Loomis, Seattle, Wash., assignor to Industrial Promotional Toys, Inc.
Filed Jan. 21, 1976, Ser. No. 651,024
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 HH

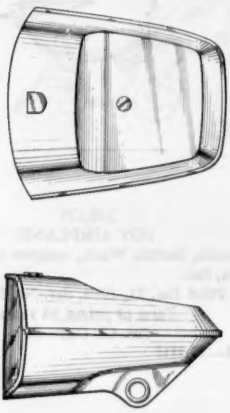
249,179
TOY AIRPLANE
James F. Loomis, Seattle, Wash., assignor to Industrial Promotional Toys, Inc.
Filed Jan. 21, 1976, Ser. No. 651,025
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 HH



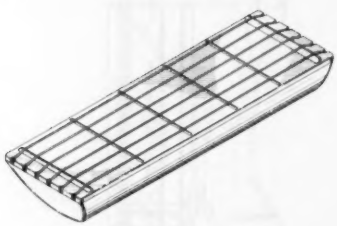
249,180
COMBINED CANDLES AND CONTAINER THEREFOR
Willy H. Vanbragt, 111 Rengstorff #92, Mountain View, Calif. 94040
Filed Feb. 10, 1977, Ser. No. 767,283
Term of patent 14 years
Int. Cl. D26—*01*
U.S. Cl. D48—2



249,181
BICYCLE LAMP
Werner Glasenapp, and Jörg Glasenapp, both of Essen, Fed. Rep. of Germany, assignors to Union Sils, van de Loo & Co., Frondenberg, Fed. Rep. of Germany
Filed Feb. 25, 1977, Ser. No. 771,950
Claims priority, application Fed. Rep. of Germany, Sep. 10, 1976, MR 82
Term of patent 14 years
Int. Cl. D26—*03, 06*
U.S. Cl. D48—24 A



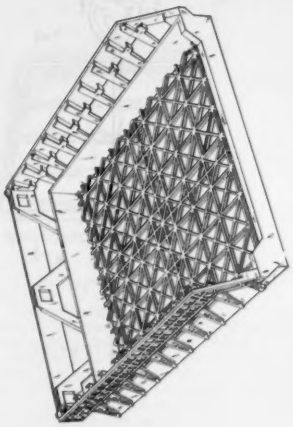
249,182
POCKET FINGER EXERCISE BOARD
Michael M. Greer, Box 22, McGrath, Ak. 99627
Filed Oct. 8, 1976, Ser. No. 730,761
Term of patent 14 years
Int. Cl. D17—*99, 03*
U.S. Cl. D56—1 R



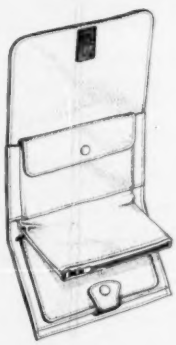
249,183
HARP
Walter Krasicki, 5810 W. Schubert, Chicago, Ill. 60039
Filed Dec. 27, 1976, Ser. No. 754,884
Term of patent 14 years
Int. Cl. D17—*03*
U.S. Cl. D56—1 A

249,184
BOX FOR SCHOOL SUPPLIES
Wilma Rae Hargrove, 1132 Livingston St., Hurst, Tex. 76053
Filed Jan. 19, 1976, Ser. No. 650,112
Term of patent 7 years
Int. Cl. D3—*01*
U.S. Cl. D87—1 R

249,185
BAKERY CONTAINER OR THE LIKE
James C. Carroll, and Lewis T. Johnson, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.
Filed Jun. 28, 1976, Ser. No. 700,436
Term of patent 14 years
Int. Cl. D9—*04*
U.S. Cl. D87—1 R



249,186
HANDBAG
Milton I. Siegel, Scottsdale, Ariz., assignor to Amba Marketing Systems, Inc., Tempe, Ariz.
Filed Aug. 23, 1976, Ser. No. 716,421
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—3 D

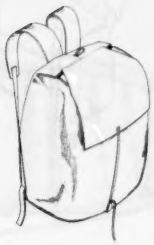


249,187
BACK PACK
Scott Stewart, c/o Stewart Designs, Inc., 901 Watson St., Madison, Wis. 53713
Filed Dec. 3, 1976, Ser. No. 747,291
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—5 R

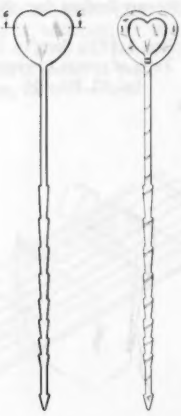
249,188
BACK PACK
Scott Stewart, c/o Stewart Designs, Inc., 901 Watson St., Madison, Wis. 53713
Filed Dec. 3, 1976, Ser. No. 747,292
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—5 R

249,189
BACK PACK
Scott Stewart, c/o Stewart Designs, Inc., 901 Watson St., Madison, Wis. 53713
Filed Dec. 3, 1976, Ser. No. 747,294
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—5 R

249,190
BACK PACK
Scott Stewart, c/o Stewart Designs, Inc. 901 Watson St., Madison, Wis. 53713
Filed Dec. 6, 1976, Ser. No. 747,888
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—5 R



249,191
HOLDER FOR CARDS OR THE LIKE
Walter Boecher, Jr., P.O. Box 3455, Lantana, Fla. 33462
Filed Jan. 24, 1977, Ser. No. 761,673
Term of patent 14 years
Int. Cl. D20—*99*
U.S. Cl. D96—12 A



249,192
HOLDER FOR CARDS OR THE LIKE
Walter Boecher, Jr., P.O. Box 3455, Lantana, Fla. 33462
Filed Feb. 14, 1977, Ser. No. 768,261
Term of patent 14 years
Int. Cl. D20—*99*
U.S. Cl. D96—12 A

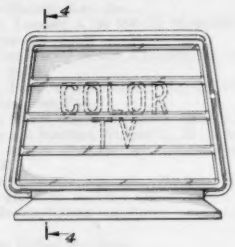
249,193
HOLDER FOR CARDS OR THE LIKE
Walter Boecher, Jr., P.O. Box 3455, Lantana, Fla. 33462
Filed Feb. 14, 1977, Ser. No. 768,270
Term of patent 14 years
Int. Cl. D20—*99*
U.S. Cl. D96—12 A

249,194

## MOVABLE LETTERING ADVERTISING DISPLAY

Robert C. Carlson, Long Beach, Calif., assignor to Gulf Development, Inc., Torrance, Calif.

Filed Jun. 28, 1976, Ser. No. 700,092
Term of patent 14 years
Int. Cl. D20—*03*
U.S. Cl. D96—12 R

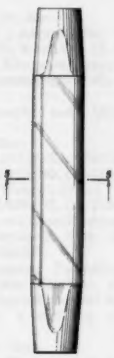



249,195

## VISUAL DISPLAY HOLDER FOR ATTACHMENT TO THE SHAFTS OF MECHANICAL SKI-TOW EQUIPMENT AND ON THE SAFETY BARS OF SKI CHAIR-LIFT EQUIPMENT

Patrick Marie Winckler, 85 Blvd. des Belges, 69006 Lyon, France

Filed Aug. 11, 1976, Ser. No. 713,483
Claims priority, application France, Feb. 27, 1976, 76 2849
Term of patent 14 years
Int. Cl. D20—*03*
U.S. Cl. D96—12 R



# LIST OF PATENTEES

## TO WHOM

## PATENTS WERE ISSUED ON THE 29TH DAY OF AUGUST, 1978

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).


Aarons, Raymond Joseph, to Monier Colourtile Pty. Ltd. Roof edging. 4,109,428, Cl. 52-94.000.

AB Bofors: *See*—
Bjorkqvist, Nils Gunnar; Franzen, Hans Arne Edgar; and Johansson, Karl Ingmar Wenzel, 4,109,577, Cl. 102-35.600.
Pettersson, Bror Gosta, 4,110,331, Cl. 260-293.770.

AB Svenska Flaktfabriken: *See*—
Widerby, Lennart, 4,109,564, Cl. 98-40.00N.

AB Volvo: *See*—
Pilhall, Stig Tore Lennart, 4,109,930, Cl. 280-491.00B.

AB Ziristor: *See*—
Rausing, Hans A., 4,109,814, Cl. 215-217.000.

Abbott Laboratories: *See*—
Horrom, Bruce Wayne, 4,110,471, Cl. 424-330.000.

Abe, Kichio; and Martino, William L., Jr., to Motorola Inc. Sense line charging system for random access memory. 4,110,840, Cl. 365-203.000.

Abe, Takeshi; Ichimura, Masahiko; Noshiro, Makoto; Kunii, Nobuaki; and Ito, Yasumichi, to Ashai Glass Company Ltd. Stabilized ethylene-tetrafluoroethylene copolymer composition. 4,110,308, Cl. 260-45.75C.

Abercrombie, Bolling A.: *See*—
McMurry, Everett D.; and Abercrombie, Bolling A., 4,110,057, Cl. 417-109.000.

Abercrombie, William Floyd, Jr.: *See*—
Kunkle, Albert C.; Abercrombie, William Floyd, Jr.; and Akins, Charles John, Jr., 4,110,189, Cl. 204-180.00R.

Abert-Mellah, Marie Annick; Dubois, Jean Claude; and Zann, Annie, to Thomson-CSF. Alkylphenyl 3-cyano or fluoro-4-alkyloxybenzoates and mesomorphic mixtures thereof. 4,110,243, Cl. 252-299.000.

Acar, Ali, to International Telephone and Telegraph Corporation. Relief valve. 4,109,675, Cl. 137-494.000.

Aciers et Outillage Peugeot: *See*—
Roger, Jean, 4,110,671, Cl. 318-227.000.

Acme Marls Limited: *See*—
Lovatt, William John, 4,110,069, Cl. 432-258.000.

Acre, Leon R., to Midland-Ross Corporation. Clamp band. 4,109,350, Cl. 24-249.0LS.

Adams, Allen B., legal representative: *See*—
Berg, Norman J.; Smith, Bob Lorin, deceased; and Adams, Allen B., legal representative, 4,110,016, Cl. 350-358.000.

Adams, John O.: *See*—
Specht, Steven J.; and Adams, John O., 4,110,191, Cl. 204-266.000.

Adams, Kenneth D., to Singer Company, The. Electro-mechanical actuator. 4,109,597, Cl. 112-158.00E.

Adams, Stanley B.; and Morge, Michael P., to Caterpillar Tractor Co. Dump control for loaders. 4,109,812, Cl. 214-762.000.

Adamson, James Sidney. System and apparatus for extracting oil and the like from tar sands in situ. 4,109,715, Cl. 166-177.000.

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Nelson, Alfred N.; and Davis, David L., 4,110,758, Cl. 346-74.100.

Advanced Micro Devices, Inc.: *See*—
Sarkissian, Vahe A.; Jayakumar, Nagab; Kroeger, Joseph H.; and Schlageter, Jeffrey M., 4,110,842, Cl. 365-233.000.

Aelony, David; and Vofsi, David, to Makhteshim Chemical Works Ltd. Novel halogenated organic compounds, process for the production of same, and polyurethanes containing same. 4,110,379, Cl. 260-584.00R.

Aero-Spec Products Co., Ltd.: *See*—
Fujiwara, Yasuo, 4,110,065, Cl. 431-255.000.

Agee, Charles W.: *See*—
Kinley, John C.; Anderson, Clifford E.; Agee, Charles W.; and Dieckman, Harry E., 4,109,386, Cl. 33-178.00F.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See*—
Ducol, Jean-Paul; Gobry, Dominique; Raisin, Jean-Pierre; and Agence Nationale de Valorisation de la Recherche (ANVAR), 4,109,595, Cl. 112-121.110.
Jolles, Pierre; and Migliore-Samour, Daniele, 4,110,434, Cl. 424-92.000.

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Kono, Hidehiko, 4,110,736, Cl. 340-146.3AE.

AGFA-Gevaert Aktiengesellschaft: *See*—
Melzer, Arnfried; Marx, Paul; and Puschel, Walter, 4,110,113, Cl. 96-29.00D.

Ahlgren, Richard M.; and Schneider, Burnett M., to Aqua-Chem, Inc. Electrodialysis method. 4,110,175, Cl. 204-180.00P.

Air Master Systems, Inc.: *See*—
Hunzicker, Dean L., 4,109,641, Cl. 126-299.00D.

Air Pollution Systems, Inc.: *See*—
Schwab, James J.; and Goodson, David B., 4,110,086, Cl. 55-7.000.

Airomat Corporation, The: *See*—
Feasel, James E., 4,109,439, Cl. 52-667.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Terada, Takami, 4,109,973, Cl. 308-3.00R.

Ajax Electric Company: *See*—
Mehrkam, Quentin D., 4,109,897, Cl. 266-120.000.

Akamatsu, Masahiko, to Mitsubishi Denki Kabushiki Kaisha. Synchronous machine control system. 4,110,669, Cl. 318175-.

Akebono Brake Industry Co., Ltd.: *See*—
Inoue, Takehisa; Ogawa, Yutaka; Sugita, Hiroaki; and Watanabe, Namio, 4,109,766, Cl. 188-73.400.

Akin, Paul A. Miter table for portable circular saw. 4,109,901, Cl. 269-290.000.

Akins, Charles John, Jr.: *See*—
Kunkle, Albert C.; Abercrombie, William Floyd, Jr.; and Akins, Charles John, Jr., 4,110,189, Cl. 204-180.00R.

Akita, Sigeyuki; and Kitagawa, Junji, to Nippon Soken, Inc. Liquid level detecting apparatus. 4,110,740, Cl. 340-620.000.

Akst, Irving B.: *See*—
Hershkowitz, Joseph; and Akst, Irving B., 4,110,136, Cl. 149-47.000.

Aktiebolaget Tudor: *See*—
Nilsson, Ove, 4,110,519, Cl. 429-217.000.
Westberg, Erik, 4,110,490, Cl. 427-180.000.

Aktien-Gesellschaft "Weser": *See*—
Voss, Siegfried, 4,109,602, Cl. 114-218.000.

Akutin, Modest Sergeevich; and Levina, Tamara Grigorievna. Process for producing polymeric films from crystallizable polyesters. 4,110,395, Cl. 264-210.00R.

Akutsu, Shoji; Watanabe, Yasumasa; Mashino, Yasuhiko; Chaki, Tomohiro; and Fujita, Masakazu, to Kawasaki Steel Corporation; and Toei Denshi Kogyo Kabushiki Kaisha. Method of and an apparatus for inspecting a traveling sheet material. 4,110,048, Cl. 356-200.000.

Akzona Incorporated: *See*—
Greven, Hendrik Marie; and de Wied, David, 4,110,322, Cl. 260-112.50R.

Albers, Kenneth H.; and Wright, Howard N., Jr., to Eastman Kodak Company. Process for the preparation of 2,2,4-trimethyl-1,3-pentanediol diisobutyrate. 4,110,539, Cl. 560-240.000.

Albert, William Charles, to Singer Company, The. Apparatus for monitoring acceleration. 4,109,534, Cl. 73-503.000.

Albright, Charles Jere; Fitch, Clifford E., Sr.; and Fitch, Clifford E., Jr. Method of cooking food in hot non-aqueous liquids under air pressure. 4,110,481, Cl. 426-438.000.

Alco Electronic Products, Inc.: *See*—
Kirchoff, Francis D., 4,110,574, Cl. 200-67.00G.

Alcolac Inc.: *See*—
Vandegaer, Jan E.; and Calentine, John W., 4,110,286, Cl. 260-29.2TN.

Allemann, James G., to Norris Industries. Simultaneous retract mechanism. 4,109,494, Cl. 70-107.000.

Allemann, James G.; and Grey, Michael W., to Norris Industries. Trapped key mechanism. 4,109,496, Cl. 70-380.000.

Allen, Joseph C.; and Redford, David A., to Texaco Inc.; and Texaco Exploration Canada, Ltd. Combination solvent-noncondensible gas injection method for recovering petroleum from viscous petroleum-containing formations including tar sand deposits. 4,109,720, Cl. 166-269.000.

Allen, Joseph C., to Texaco Inc. Secondary recovery process utilizing water saturated with gas. 4,110,224, Cl. 252-8.55D.

Allen, Richard A. Foldable carrier. 4,109,839, Cl. 224-29.00R.

Allen, Wilbur J.: *See*—
Powers, Whitney S., Jr.; Hobler, Ross L.; Bryant, Nelson H.; and Allen, Wilbur J., 4,109,511, Cl. 73-37.600.

Allied Chemical Corporation: *See*—
Anello, Louis G.; and Sweeney, Richard F., 4,110,406, Cl. 260-653.400.
Anello, Louis G.; Sweeney, Richard F.; and Sukornick, Bernard, 4,110,407, Cl. 260-653.400.
Anello, Louis G.; and Sweeney, Richard F., 4,110,408, Cl. 260-653.400.

Allied Industries Inc.: *See*—
Leonard, James H., Jr., 4,109,827, Cl. 222-1.000.

Alpha Industries, Inc.: *See*—
Borzym, Alexander, 4,109,555, Cl. 83-700.000.

Altwein, Michael, to Carl Schenck AG. Method and circuit arrangement for the multiplication of electrical signals. 4,110,834, Cl. 364-841.000.

Aluminum Company of America: *See*—
Collins, John W., III, 4,109,815, Cl. 215-232.000.
Hawkins, Ronald G.; Tuttle, Paul D.; and Baker, Mark A., 4,110,553, Cl. 174-42.000.

LaCamera, Alfred F.; Trzeciak, Thomas A.; and Kinosz, Donald L., 4,110,178, Cl. 204-64.00R.
Schultz, Freddy R., 4,109,599, Cl. 113-121.00C.
Whetstone, Clayton N.; Koop, Douglas A.; and Dowd, James D., 4,109,374, Cl. 29-599.000.

Alvey, Inc.: *See—*
Moons, Hugo, 4,109,781, Cl. 198-485.000.

Alwani, Dru W.: *See—*
Barabas, Eugene S.; Klein, Andrew; and Alwani, Dru W., 4,110,291, Cl. 260-29.6RW.

Amann, Rolf; and Seidl, Horst, to Daimler-Benz Aktiengesellschaft. Glove compartment for motor vehicles. 4,109,955, Cl. 296-37.100.

Amax Inc.: *See—*
Hoover, Raul M.; Lussiez, Guy W.; and Reid, Hugh F., 4,110,401, Cl. 423-150.000.
Jha, Mahesh C.; Wicker, Gordon R.; and Meyer, Gustavo A., 4,110,400, Cl. 423-141.000.

AMCOR Ltd.: *See—*
Yavnieli, Mordechai, 4,109,408, Cl. 43-112.000.

Amdal, Dagfinn O., to Keystone Consolidated Industries, Inc. Door opener and latch. 4,109,950, Cl. 292-254.000.

Amerace Corporation: *See—*
Di Pietro, Francis M., 4,110,550, Cl. 174-19.000.

American Cyanamid Company: *See—*
Berkelhammer, Gerald; and Kameswaran, Venkatamaran, 4,110,345, Cl. 260-340.50R.
Floyd, Middleton Brawner, Jr.; Weiss, Martin Joseph; Poletto, John Frank; Schaub, Robert Eugene; and Bernady, Karel Francis, 4,110,368, Cl. 260-514.00D.
Hanifin, John William, Jr.; Gussin, Robert Zalmon; and Cohen, Elliott, 4,110,445, Cl. 424-229.000.
Los, Marinus, 4,110,103, Cl. 71-92.000.
Reddy, Thomas B., 4,110,015, Cl. 350-357.000.
Roth, Philip B., 4,110,509, Cl. 428-276.000.
Schirmann, Peter Jude; and Blank, Werner Josef, 4,110,288, Cl. 260-29.4UA.
Wang, Samuel Shan Ning; and Smith, Eugene Leroy, Jr., 4,110,207, Cl. 209-166.000.

American Hoechst Corporation: *See—*
Helsley, Grover C.; Strupczewski, Joseph T.; and Gardner, Beth Ann, 4,110,459, Cl. 424-267.000.

American Hoist & Derrick Company: *See—*
Hornagold, John T.; Beckley, Gary H.; and Rathi, Ram N., 4,109,747, Cl. 180-140.000.

American Home Products Corporation: *See—*
Gahwyler, Max, 4,110,438, Cl. 424-177.000.
Sellstedt, John H.; Guinosso, Charles J.; and Begany, Albert J., 4,110,453, Cl. 424-251.000.
Sellstedt, John H.; Guinosso, Charles J.; and Begany, Albert J., 4,110,458, Cl. 424-263.000.

American Optical Corporation: *See—*
Andresen, Richard Paul, 4,110,564, Cl. 179-15.55T.
Hovey, Richard J., 4,110,244, Cl. 252-300.000.

American Seating Company: *See—*
Barecki, Chester J.; Lewis, Donald R.; and Camp, Terry L., 4,109,959, Cl. 297-216.000.

American Standard Inc.: *See—*
Schuman, Mark, 4,110,618, Cl. 250-343.000.

American Technical Institute, Inc.: *See—*
Sargent, Harry; and Spiegel, Si, 4,109,345, Cl. 16-149.000.

Amery, John Gordon; and Burrus, Thomas William, to RCA Corporation. Noise reduction apparatus. 4,110,784, Cl. 358-8.000.

Ametek, Inc.: *See—*
Reed, Charles J.; and Cook, Claren K., 4,109,535, Cl. 73-706.000.

AMP Incorporated: *See—*
Bogar, Jerry Hench; and Johnson, Tore Rudolf, 4,110,000, Cl. 350-96.210.
Hughes, Donald Wayne Kent; and Porta, Gary Douglas, 4,109,992, Cl. 339-147.00R.
Snyder, Clair Wilson, Jr.; and Derr, Paul Birchard, 4,109,989, Cl. 339-94.00M.

Ampex Corporation: *See—*
Miller, Jerry W.; and Gallo, Luigi C., 4,110,798, Cl. 360-65.000.

AMSTED Industries Incorporated: *See—*
Brose, Albert F., 4,109,585, Cl. 105-197.0DB.

Anaconda Company, The: *See—*
May, Peter J.; and Stump, Theodore M., 4,110,563, Cl. 179-15.0BW.

Anderson, Clifford E.: *See—*
Kinley, John C.; Anderson, Clifford E.; Agee, Charles W.; and Dieckman, Harry E., 4,109,386, Cl. 33-178.00F.

Anderson, Edwin A.: *See—*
Webb, Derrel D.; and Anderson, Edwin A., 4,109,736, Cl. 175-297.000.

Anderson, Harold G.; and Guess, Jeuel E., to General Electric Company. Gas mixer. 4,110,067, Cl. 431-346.000.

Anderson, Jerry F.: *See—*
Smith, Kenneth J.; and Anderson, Jerry F., 4,109,390, Cl. 33-265.000.

Anderson, Lloyd E. Cutting tool and blade holder for replaceable blades. 4,109,380, Cl. 30-162.000.

Anderson, Marshall N., to Sellstrom Manufacturing Company. Attaching assembly. 4,109,320, Cl. 2-10.000.

Andresen, Bernhard Hans: *See—*
Giolma, William Henry; and Andresen, Bernhard Hans, 4,110,707, Cl. 332-19.000.

Andresen, Richard Paul, to American Optical Corporation. Time-compression system. 4,110,564, Cl. 179-15.55T.

Andruchiw, Roman, to Step-Rite Limited. Stair climbing device. 4,109,740, Cl. 180-8.00A.

Anello, Louis G.; and Sweeney, Richard F., to Allied Chemical Corporation. Preparation of 1-chloro-2-trifluoromethyl-3,3,3-trifluoropropene from isobutylene. 4,110,406, Cl. 260-653.400.

Anello, Louis G.; Sweeney, Richard F.; and Sukornick, Bernard, to Allied Chemical Corporation. Preparation of 1-chloro-2-trifluoromethyl-3,3,3-trifluoropropene from isobutane. 4,110,407, Cl. 260-653.400.

Anello, Louis G.; and Sweeney, Richard F., to Allied Chemical Corporation. Preparation of 1-chloro-2-trifluoromethyl-3,3,3-trifluoropropene from isobutylene. 4,110,408, Cl. 260-653.400.

Angstadt, Howard P., to Suntech, Inc. Ammoxidation process and catalyst. 4,110,250, Cl. 252-432.000.

ANIC S.p.A.: *See—*
Clerici, Mario Gabriele; Maspero, Federico; and D'Alfonso, Alfonso, 4,110,377, Cl. 260-583.00R.

Antos, George J., to UOP Inc. Hydrocarbon conversion with an acidic sulfur-free multimetallic catalytic composite. 4,110,200, Cl. 208-139.000.

Antos, George J., to UOP Inc. Hydrocarbon conversion with an acidic sulfur-free multimetallic catalytic composite. 4,110,201, Cl. 208-139.000.

Antos, George J.: *See—*
Flagg, John F.; and Antos, George J., 4,110,199, Cl. 208-139.000.

Anzai, Makoto: *See—*
Aono, Shigeo; and Anzai, Makoto, 4,109,626, Cl. 123-139.0AW.

Aoki, Hatsuo: *See—*
Mori, Shigeru; Ohsawa, Shigeyoshi; Aoki, Hatsuo; and Imanaka, Hiroshi, 4,110,166, Cl. 195-96.000.

Aono, Shigeo; and Anzai, Makoto, to Nissan Motor Company, Limited. Fuel supply control system with feedback fuel pipe for internal combustion engine. 4,109,626, Cl. 123-139.0AW.

Aonuma, Masashi: *See—*
Ogawa, Hiroshi; Aonuma, Masashi; Nakamura, Matsuaki; and Tamai, Yasuo, 4,110,503, Cl. 428-64.000.

Aoyagi, Tatsuhiro: *See—*
Yagi, Norio; Matsumura, Hideki; Aoyagi, Tatsuhiro; and Kishi, Ikuji, 4,110,314, Cl. 528-26.000.

Apel, Gerhard: *See—*
Cohnen, Wolfgang; and Apel, Gerhard, 4,110,273, Cl. 521-59.000.

Appel, Douglas C.: *See—*
Babish, John A.; Arnot, Larry K.; and Appel, Douglas C., 4,109,703, Cl. 165-1.000.

Appleby, David: *See—*
Porter, Stephen George; and Appleby, David, 4,110,616, Cl. 250-338.000.

Aqua-Chem, Inc.: *See—*
Ahlgren, Richard M.; and Schneider, Burnett M., 4,110,175, Cl. 204-180.00P.

Aquilla, John J. Sheet stripping device. 4,109,842, Cl. 225-98.000.

Arai, Akihiro: *See—*
Miyata, Katsuhiko; Urano, Fumio; and Arai, Akihiro, 4,110,765, Cl. 354-59.000.

Araki, Tetsuro; and Hayashi, Hideaki, to Nippon Columbia Kabushikikaisha. Braking apparatus. 4,110,670, Cl. 318-212.000.

Archer, Henry W.: *See—*
Paull, Peter L.; and Archer, Henry W., 4,110,628, Cl. 290-1.00R.

Argus Chemical Corporation: *See—*
Minagawa, Motonobu; Kubota, Naohiro; and Shibata, Toshihiro, 4,110,306, Cl. 260-45.80N.

Arisawa, Katsuyoshi: *See—*
Kiyono, Yutaka; Nagata, Shigeaki; Shigemori, Shuichiro; Kishimoto, Tadashi; Maruyama, Sadao; and Arisawa, Katsuyoshi, 4,109,999, Cl. 350-91.000.

Ariyan, Zaven S.: *See—*
Moser, Robert E.; Powers, Larry J.; and Ariyan, Zaven S., 4,110,451, Cl. 424-251.000.

Arkles, Barry C.; and Gerakaris, Stephen, to Beatrice Foods Co. Fluorinated ethylene-propylene copolymer powders having improved adhesion to substrates and method. 4,110,186, Cl. 204-159.200.

Armstrong Chemical Co., Inc.: *See—*
Braunwarth, John B., 4,110,358, Cl. 260-404.500.

Armstrong Cork Company: *See—*
Dieck, Ronald L.; and Magnusson, Alan B., 4,110,421, Cl. 423-300.000.

Arnau, Jose Luis; Barrat, Christian Roland; and Wevers, Jean, to Procter & Gamble Company, The. Liquid detergent composition. 4,110,262, Cl. 252-545.000.

Arndt, Wolfgang: *See—*
Heine, Bernhard; Arndt, Wolfgang; and Lower, Hartmut, 4,110,555, Cl. 178-3.000.

Arnot, Larry K.: *See—*
Babish, John A.; Arnot, Larry K.; and Appel, Douglas C., 4,109,703, Cl. 165-1.000.

Arns, Harold Ernest: *See—*
Rotter, Gerhard; and Arns, Haroid Ernest, 4,110,800, Cl. 360-74.000.

Arntzen, John D., to United States of America, Energy. Electrochemical cell design. 4,110,517, Cl. 429-133.000.

Arpe, Hans-Jurgen: *See—*
Hey, Hansjorg; Schaum, Helmut; and Arpe, Hans-Jurgen, 4,110,372, Cl. 260-540.000.

Arrieta, Diogenes A.: *See*—
Hurtado T, Jorge E.; and Arrieta, Diogenes A., 4,109,865, Cl. 239-147.000.
Arutunian, Gregory; and Monte, Anthony J., to United States of America, Army. Non-recurrent pulse generator. 4,110,812, Cl. 361-248.000.
Asahi Kogaku Kogyo Kabushiki Kaisha: *See*—
Miyata, Katsuhiko; Urano, Fumio; and Arai, Akihiro, 4,110,765, Cl. 354-59.000.
Asano, Masaharu, to Nissan Motor Company, Limited. Apparatus for controlling the ratio of air to fuel of air-fuel mixture of internal combustion engine. 4,109,615, Cl. 123-32.0EE.
Asars, Juris A.; Davies, David H.; and Brody, Thomas P., to Westinghouse Electric Corp. Electroluminescent bargraph with integral thin-film transistor control circuitry. 4,110,664, Cl. 315-169.0TV.
Asars, Juris A.: *See*—.
Greeneich, Edwin W.; and Asars, Juris A., 4,110,662, Cl. 315-169.0TV.
ASEA Aktiebolag: *See*—
Stenkvist, Sven-Einar, 4,110,546, Cl. 13-11.000.
Ashai Glass Company Ltd.: *See*—
Abe, Takeshi; Ichimura, Masahiko; Noshiro, Makoto; Kunii, Nobuaki; and Ito, Yasumichi, 4,110,308, Cl. 260-45.75C.
Ashby, Edward P., Jr. Anti-skid brake control system. 4,109,970, Cl. 303-116.000.
Askarov, Mikhail Arkadievich: *See*—
Pirkulov, Vladimir Georgievich; Askarov, Mikhail Arkadievich; and Dzhashi, Avtandil Vladimirovich, 4,110,241, Cl. 252-182.100.
Askew, Anthony B.: *See*—
Hull, Ezekiel H.; and McIntosh, Robert H., 4,110,504, Cl. 428-97.000.
Aspro, Inc.: *See*—
Kraft, Derald H., 4,109,542, Cl. 74-230.800.
Asseff, Carl F.: *See*—
Becker, Bernard; Stamper, Robert L.; Asseff, Carl F.; and Podos, Steven M., 4,110,461, Cl. 424-273.00R.
Atlas Powder Company: *See*—
Wade, Charles G., 4,110,134, Cl. 149-2.000.
Atsugi Motor Parts Company, Limited: *See*—
Washio, Masayuki; and Harada, Tetsuya, 4,109,624, Cl. 123-119.00A.
Aughton, John E., to Crosfield Electronics Limited. Half-tone image recording system. 4,110,796, Cl. 358-298.000.
Aunstrup, Knud: *See*—
Hjortshoj, Kirsten; and Aunstrup, Knud, 4,110,163, Cl. 195-62.000.
Autoipari Kutato Intezet: *See*—
Koroknay, Laszlo; and Ratsko, Istvan, 4,109,929, Cl. 280-432.000.
Automotive Products Limited: *See*—
Higgerson, Raymond; and Parsons, David, 4,109,773, Cl. 192-111.00A.
Hubbard, William Ernest; Hyde, Robert; and Crawford, Peter Frederick, 4,109,368, Cl. 29-446.000.
Avery Products Corporation: *See*—
Dunning, Richard E.; and Nelson, Marshall A., 4,110,152, Cl. 156-553.000.
Axen, Charles G.: *See*—
Boronkay, Attila D.; and Axen, Charles G., 4,110,677, Cl. 323-19.000.
Ayerst, McKenna & Harrison Limited: *See*—
Bagli, Jehan F.; and Bogri, Tibor, 4,110,468, Cl. 424-301.000.
Azam, Guy; and Perraudin, Claude, to CGR-MeV. Device for scanning a target with a beam of charged particles. 4,110,623, Cl. 250-398.000.
B. F. Goodrich Company, The: *See*—
Lindsay, Geoffrey Andrew; and Stricharczuk, Paul Thomas, 4,110,414, Cl. 260-897.00A.
Minchak, Robert John, 4,110,528, Cl. 526-283.000.
Summers, James William, 4,110,062, Cl. 425-71.000.
Babcock & Wilcox Co., The: *See*—
Jabsen, Felix Stanley, 4,110,157, Cl. 176-36.00C.
Womack, Robert Edward, 4,110,620, Cl. 250-361.00R.
Babish, John A.; Arnot, Larry K.; and Appel, Douglas C., to Wynn Oil Company. Engine cooling system flushing apparatus and method. 4,109,703, Cl. 165-1.000.
Bacchelli, Sancio. Development of instruments measuring body resistance to ion and ionophoresis applications. 4,109,645, Cl. 128-2.10Z.
Bach, Nicholas J.; and Kornfeld, Edmund C., to Eli Lilly and Company. 4-(Di-n-propyl)amino-1,3,4,5-tetrahydrobenz[cd]indole. 4,110,339, Cl. 260-326.900.
Bachl, Robert: *See*—
Schweier, Guenther; Kolk, Erich; Mueller-Tamm, Heinz; Frielingsdorf, Hans; Bachl, Robert; and Gruber, Wolfgang, 4,110,523, Cl. 526-124.000.
Bachli, Emil. Scarecrow system. 4,109,605, Cl. 116-22.00A.
Badali, Joseph A., to Browning Arms Company. Detachable barrel for hand guns. 4,109,403, Cl. 42-75.00B.
Baer, James, to Pay Less Drug Stores Northwest, Inc. Labeling. 4,110,502, Cl. 428-40.000.
Baetz, Jacques Louis Edouard, to Metabio. 2,3-Dihydro-imidazo[2,1-b]-thiazole derivatives and applications thereof. 4,110,460, Cl. 424-270.000.
Bagli, Jehan F.; and Bogri, Tibor, to Ayerst, McKenna & Harrison Limited. Tropone derivatives and theraputic use therefor. 4,110,468, Cl. 424-301.000.
Bahr, Donald W.: *See*—
Ekstedt, Edward E.; Beck, Edwin J., Jr.; Bahr, Donald W.; and Weinstein, Barry, 4,109,459, Cl. 60-39.660.
Bailey, John D., to Railway Engineering & Supply Company, Inc. Method for replacing different railroad car door roller assemblies. 4,109,847, Cl. 228-119.000.
Bailey, John M., to Monitoring Systems, Inc. Method and apparatus for pipe joint locator, counter and displacement calculator. 4,110,688, Cl. 324-208.000.
Bailey, Wayne W.; and Taylor, Brian W., to Gulf Research & Development Company. Lithium base grease containing polyisobutylene. 4,110,233, Cl. 252-41.000.
Bailly, Jean Claude: *See*—
Sandis, Stylianos; and Bailly, Jean Claude, 4,110,248, Cl. 252-429.00B.
Baird, Billy C.: *See*—
Baird, William R.; Sutton, Kenneth O.; and Baird, Billy C., 4,110,171, Cl. 202-241.000.
Baird, William R.; Sutton, Kenneth O.; and Baird, Billy C., to Saturn Machine & Welding Co., Inc. Mechanical jamb cleaner. 4,110,171, Cl. 202-241.000.
Bakalov, Nikolay Georgiev: *See*—
Peev, Vassil Georgiev; Valchev, Alexander Yordanov; and Bakalov, Nikolay Georgiev, 4,110,547, Cl. 13-11.000.
Baker, Lionel Richard; and Wojtowicz, Tadeusz, to National Research Development Corporation. Optical apparatus and method. 4,110,046, Cl. 356-124.000.
Baker, Mark A.: *See*—
Hawkins, Ronald G.; Tuttle, Paul D.; and Baker, Mark A., 4,110,553, Cl. 174-42.000.
Balcom, Orville R.; Hildebrand, Cleve R.; and Pollard, Edward L., to Cetec Corporation. Shaft angle transducer. 4,109,389, Cl. 33-363.00K.
Balda-Werke Photographische Gerate und Kunststoff GmbH & Co. KG: *See*—
Lange, Karl-Heinz, 4,110,770, Cl. 354-202.000.
Baldwin, John J.; and Novello, Frederick C., to Merck & Co., Inc. 4-Substituted-2-arylimidazoles. 4,110,456, Cl. 424-263.000.
Balz, Gunther W., to Roto-Finish Company. Glass bonded finishing media. 4,110,085, Cl. 51-308.000.
Bando, Yasuo: *See*—
Umemura, Sumio; Ohdan, Kyoji; Sakai, Fumihiko; Bando, Yasuo; and Ikezawa, Harumi, 4,110,350, Cl. 260-346.750.
Bantex A/S: *See*—
Bro, Niels, 4,110,146, Cl. 156-291.000.
Banucci, Eugene George; and Olander, Walter Karl, to General Electric Company. Method for preparing polyphenylene oxides with manganese-vinyl resin complexes. 4,110,312, Cl. 528-215.000.
Barabas, Eugene S.; Klein, Andrew; and Alwani, Dru W., to GAF Corporation. Copolymer emulsions for thickening acrylic polymer latices. 4,110,291, Cl. 260-29.6RW.
Barber, Colin: *See*—
Larke, John Reginald; Barber, Colin; and Cotterill, David John, 4,109,648, Cl. 128-2.06E.
Barber, Franklin T., to Phillips Petroleum Company. Process for recovery and purification of a perfluorocarboxylic acid fluoride from electrochemical cell fluorination effluent. 4,110,177, Cl. 204-59.00F.
Barber, Randy B.: *See*—
Rapoport, Henry; and Barber, Randy B., 4,110,329, Cl. 260-270.00A.
Barecki, Chester J.; Lewis, Donald R.; and Camp, Terry L., to American Seating Company. Transportation seat with energy absorption. 4,109,959, Cl. 297-216.000.
Barkan, Philip, to General Electric Company. Stored-energy operating device for an electric circuit breaker. 4,110,582, Cl. 200-153.0SC.
Barmag Barmer Maschinenfabrik Aktiengesellschaft: *See*—
Burow, Burghard; and Klinkert, Norbert, 4,109,357, Cl. 28-289.000.
Barnes Drill Co.: *See*—
Marriott, Roger; and Estabrook, Mark R., 4,110,218, Cl. 210-223.000.
Barnes, William John; Belcher, Barry John; and Harvey, John Kenneth, to Newroyd Limited. Machine for making a textile product. 4,109,593, Cl. 112-79.00A.
Barnett, Charles J.; Bimm, Richard A.; and Cullinan, George C., to Eli Lilly and Company. 5'-Acetonylvincristine and related compounds. 4,110,330, Cl. 260-287.00B.
Barnett, Richard Earl; and Woodrum, Guy Thomas, to Calgon Corporation. Continuous polymerization apparatus and process. 4,110,521, Cl. 526-64.000.
Barney Knitting Machinery Co., Inc.: *See*—
Lombardi, Anthony Joseph, 4,110,145, Cl. 156-218.000.
Barnhurst, James Douglas; and Shumway, Durland Karl, to Colgate-Palmolive Company. Method of treating skin and hair with a self-heated cosmetic. 4,110,426, Cl. 424-46.000.
Barra, Emilia Francia; and Moga, Antonio Carmelo Marin, to J. Uriach & Cia S.A. 2-Phosphonoxy-4-trifluoromethylbenzoic acid derivatives and pharmaceutical compositions containing same. 4,110,442, Cl. 424-212.000.
Barrat, Christian Roland: *See*—
Arnau, Jose Luis; Barrat, Christian Roland; and Wevers, Jean, 4,110,262, Cl. 252-545.000.
Barreau, Michel; Cotrel, Claude; and Jeanmart, Claude, to Rhone-Poulenc Industries. 1,2-Dithiole derivatives. 4,110,450, Cl. 424-250.000.
Barrer, Robert, to Faltex Handels AG. Apparatus for the continuous zigzag folding of a material web. 4,109,902, Cl. 270-79.000.
Barrington, Burchus Q., to Halliburton Company. Oil well testing valve with liquid spring. 4,109,724, Cl. 166-315.000.
Bartlett, Harold H.; Herr, Charles H., Jr.; and Lamport, Ivan R., to Caterpillar Tractor Co. Dynamometer employing multiple disc brake assemblies. 4,109,519, Cl. 73-135.000.

Barton, Forris W., Jr.: *See*—
Player, Wayne H.; and Barton, Forris W., Jr., 4,109,437, Cl. 52-536.000.

BASF Aktiengesellschaft: *See*—
Baumann, Hans; and Oberlinner, Andreas, 4,110,348, Cl. 260-345.200.
Demmler, Kurt; Lawonn, Horst; and Hesse, Anton, 4,110,278, Cl. 260-17.00A.
Engelbach, Heinz; Krabetz, Richard; Duembgen, Gerd; Willersinn, Carl-Heinz; Frey, Walter; Lebert, Ulrich; and Thiessen, Fritz, 4,110,370, Cl. 260-530.00N.
Frielingsdorf, Hans; Gruber, Wolfgang; and Mueller-Tamm, Heinz, 4,110,522, Cl. 526-105.000.
Rotter, Gerhard; and Arns, Harold Ernest, 4,110,800, Cl. 360-74.000.
Sander, Bruno; Bonitz, Eckhard; and Scherling, Kurt, 4,110,385, Cl. 264-13.000.
Schweier, Guenther; Kolk, Erich; Mueller-Tamm, Heinz; Frielingsdorf, Hans; Bachl, Robert; and Gruber, Wolfgang, 4,110,523, Cl. 526-124.000.

BASF Wyandotte Corporation: *See*—
Narayan, Thirumurti, 4,110,270, Cl. 521-121.000.
Newkirk, David Dudley; Login, Robert Bernard; and Thir, Basil, 4,110,227, Cl. 252-8.900.

Bassoli, Cesare; and Cornetti, Giorgio, to FIAT Societa per Azioni. Device for monitoring the lubrication of the crankshaft of a reciprocating internal combustion engine. 4,109,506, Cl. 73-10.000.

Bates, Leonard Eugene. Truck mounted carpet cleaning machine. 4,109,340, Cl. 15-321.000.

Batey, John Walter; and Potter, Anthony Charles, to Reyrolle Parsons Limited. Inert gas welding. 4,110,590, Cl. 219-75.000.

Bauer, Karl A.; Baur, Peter F.; Biedermann, Horst H.; Madel, Andreas; Nitsch, Friedrich; Pechinger, Ernst; Koenig, Walter; Ipfelkofer, Armin; Rindsfuesser, Johann J.; and Weber, Helmut, to NCR Corporation. Media positioning means for a printer. 4,109,779, Cl. 400-584.000.

Bauerle, Gerhard, to Bunker Ramo Corporation. Plug-type electrical connectors. 4,109,993, Cl. 339-176.00M.

Bauman, William C.; Lee, John M.; and Watson, John D., to Dow Chemical Company, The. Recovery of strontium from brine that contains strontium and calcium. 4,110,402, Cl. 423-166.000.

Baumann, Gunther: *See*—
Zechnall, Richard; and Baumann, Gunther, 4,109,616, Cl. 123-32.0EA.

Baumann, Hans; and Oberlinner, Andreas, to BASF Aktiengesellschaft. 7,7'-Diamino derivatives of 2,2'-spirodibenzopyranes. 4,110,348, Cl. 260-345.200.

Baumgartner, Alfons; Berg, Walter; Burkhardt, Horst; Laubin, Jurgen; and Schlick, Helmut, to Dr. Johannes Heidenhain GmbH. Error preventing incremental measuring system. 4,110,828, Cl. 364-562.000.

Baur, Peter F.: *See*—
Bauer, Karl A.; Baur, Peter F.; Biedermann, Horst H.; Madel, Andreas; Nitsch, Friedrich; Pechinger, Ernst; Koenig, Walter; Ipfelkofer, Armin; Rindsfuesser, Johann J.; and Weber, Helmut, 4,109,779, Cl. 400-584.000.

Baxter Travenol Laboratories, Inc.: *See*—
Brown, Richard I.; and Boggs, Daniel R., 4,109,852, Cl. 233-1.00R.
Brown, Richard I., 4,109,854, Cl. 233-25.000.
Brown, Richard I.; and Duffy, Joseph Kevin, 4,109,855, Cl. 233-25.000.

Bayer Aktiengesellschaft: *See*—
Boehmke, Gunther; Fries, Hermann; and Esch, Erich, 4,110,119, Cl. 106-38.240.
Cohnen, Wolfgang; and Apel, Gerhard, 4,110,273, Cl. 521-59.000.
Freitag, Dieter; Tresper, Erhard; Kuchenmeister, Rolf; and Beer, Wolfgang, 4,110,540, Cl. 568-718.000.
Giesecke, Henning; Hocker, Jurgen; and Merten, Rudolf, 4,110,318, Cl. 528-73.000.
Hiltmann, Rudolf; Heise, Arend; Kazda, Stanislav; and Hoffmeister, Friedrich, 4,110,472, Cl. 424-330.000.

BBC Brown Boveri & Company, Limited: *See*—
Cornu, Jozef; and Weisshaar, Erich, 4,110,780, Cl. 357-38.000.
Gessinger, Gernot, 4,110,131, Cl. 148-11.50N.

BCS Mach. & Mfg. Corp.: *See*—
Sieber, Felix P., 4,110,757, Cl. 343-715.000.

Beach, Shirley, to Phillips Cable Limited. Composition for filling cables. 4,110,137, Cl. 156-48.000.

Beale, David A., to General Motors Corporation. Pressure and vacuum relief valve assembly. 4,109,674, Cl. 137-493.900.

Bean, Larry A.: *See*—
Cold, David M.; and Bean, Larry A., 4,110,088, Cl. 55-90.000.

Beard, Colin C.; Wallach, Marshall B.; and Weinhardt, Klaus, to Syntex (U.S.A.) Inc. Imidazole-2-carbamates. 4,110,463, Cl. 424-273.00R.

Beatrice Foods Co.: *See*—
Arkles, Barry C.; and Gerakaris, Stephen, 4,110,186, Cl. 204-159.200.

Becht, Carl T., to Senco Products, Inc. Surgical stapling instrument. 4,109,844, Cl. 227-120.000.

Beck, Edwin J., Jr.: *See*—
Ekstedt, Edward E.; Beck, Edwin J., Jr.; Bahr, Donald W.; and Weinstein, Barry, 4,109,459, Cl. 60-39.660.

Becker, Bernard; Stamper, Robert L.; Asseff, Carl F.; and Podos, Steven M., to United States of America, Health, Education and Welfare. Effect of diphenylhydantoin and related compounds on glaucoma. 4,110,461, Cl. 424-273.00R.

Becker, Klaus; Cittrich, Jurgen; and Kaufmann, Karl-Ernst, to Demag A.G. Passenger slide. 4,109,904, Cl. 272-56.50R.

Beckley, Gary H.: *See*—
Hornagold, John T.; Beckley, Gary H.; and Rathi, Ram N., 4,109,747, Cl. 180-140.000.

Beckman Instruments, Inc.: *See*—
Boronkay, Attila D.; and Axen, Charles G., 4,110,677, Cl. 323-19.000.

Beckmann, Ruediger: *See*—
Kummer, Horst; and Beckmann, Ruediger, 4,110,470, Cl. 424-309.000.

Becton, Dickinson and Company: *See*—
Haynes, John L.; and Shoor, Bernard A., 4,110,604, Cl. 235-92.0PC.
Williams, Joel; Dunn, Terry; and Stannett, Vivian, 4,110,185, Cl. 204-159.200.

Beecham Group Limited: *See*—
Cole, Martin; Howarth, Thomas Trevor; and Reading, Christopher, 4,110,165, Cl. 195-80.00R.
Watts, Eric Alfred, 4,110,347, Cl. 260-345.200.

Been, Peter: *See*—
Sheldon, Roger A.; Been, Peter; Wood, Derek A.; and Mason, Ronald F., 4,110,360, Cl. 260-465.00D.
Sheldon, Roger A.; and Been, Peter, 4,110,361, Cl. 260-465.00D.
Sheldon, Roger A.; and Been, Peter, 4,110,362, Cl. 260-465.00D.
Sheldon, Roger A.; and Been, Peter, 4,110,363, Cl. 260-465.00D.

Beer, Emmanuel Emil, to Singer Company, The. Tilt limiting detecting apparatus. 4,110,609, Cl. 250-231.00R.

Beer, Wolfgang: *See*—
Freitag, Dieter; Tresper, Erhard; Kuchenmeister, Rolf; and Beer, Wolfgang, 4,110,540, Cl. 568-718.000.

Begany, Albert J.: *See*—
Sellstedt, John H.; Guinosso, Charles J.; and Begany, Albert J., 4,110,453, Cl. 424-251.000.
Sellstedt, John H.; Guinosso, Charles J.; and Begany, Albert J., 4,110,458, Cl. 424-263.000.

Belcher, Barry John: *See*—
Barnes, William John; Belcher, Barry John; and Harvey, John Kenneth, 4,109,593, Cl. 112-79.00A.

Bell, Alan: *See*—
Hayden, Robert Leslie James; and Bell, Alan, 4,109,613, Cl. 122-1.00R.

Bell & Howell Company: *See*—
Elswood, Ebbert Lee, 4,110,731, Cl. 340-17.00R.
Johnson, Delmar R.; Flint, John R.; Wells, Thomas R.; Erikson, Rolf B.; and Rady, Bruce A., 4,110,020, Cl. 353-26.00A.

Bell Telephone Laboratories, Incorporated: *See*—
Schroeder, Paul Robert, 4,110,841, Cl. 365-205.000.
Shanley, James Joseph, 4,110,566, Cl. 179-18.0GF.

Belleau, Claude: *See*—
Roy, Amedee; Belleau, Claude; and Geyman, James M., 4,110,512, Cl. 428-469.000.

Bendefy nee Dobay, Erzsebet: *See*—
Feuer, Laszlo; Furka, Arpad; Sebestyen, Ferenc; Hercsel nee Szepespataky, Jolan; and Bendefy nee Dobay, Erzsebet, 4,110,441, Cl. 424-211.000.

Bendix Corporation, The: *See*—
Bourdon, Normand Charles, 4,109,987, Cl. 339-75.00M.
Cramer, Robert L.; and Henneman, John W., 4,109,509, Cl. 73-23.000.
Doi, Scott S., 4,110,573, Cl. 200-67.0DA.
Eslinger, Ralph Gilbert; and Nicolson, John Millar, 4,110,647, Cl. 310-168.000.
Johannesen, Donald Dixon, 4,109,765, Cl. 188-72.700.
Waldron, Clifford Robert; and Knapp, Carl Lee, 4,109,990, Cl. 339-89.00M.
Wolber, William George, 4,109,870, Cl. 239-558.000.

Benedict, James John, to Procter & Gamble Company, The. Abrasive composition. 4,110,083, Cl. 51-295.000.

Benefiel, Robert Lee; and Krumkalns, Eriks Viktors, to Eli Lilly and Company. Novel fluoroalkoxyphenyl-substituted nitrogen heterocycles. 4,110,099, Cl. 71-76.000.

Benjamin, Lawrence; and Walsh, Michael Andrew, to Procter & Gamble Company, The. Fabric treatment compositions. 4,110,498, Cl. 428-35.000.

Bennett, John Peter; and Jones, Graham Robin Scott, to Masson Scott Thrissell Engineering Ltd. Program control and display apparatus. 4,110,836, Cl. 364-860.000.

Bennett, R. Brian P.: *See*—
Crooks, Basil D.; and Bennett, R. Brian P., 4,110,593, Cl. 219-90.000.

Bent, John H., to Minnesota Mining and Manufacturing Company. Rotary surgical driver. 4,109,735, Cl. 173-163.000.

Beppu, Yoshitsugu: *See*—
Ikeda, Toshiki; and Beppu, Yoshitsugu, 4,110,267, Cl. 521-59.000.

Berardinelli, Frank M.: *See*—
Thomas, Norman W.; Berardinelli, Frank M.; and Edelman, Robert, 4,110,302, Cl. 260-40.00R.

Beretta, Paolo; and Valbusa, Luigi, to Minnesota Mining and Manufacturing Company. Fogged direct positive silver halide emulsion containing a cyanine dye having at least one benzoxazole or benzothiazole nucleus substituted with halogen atoms. 4,110,116, Cl. 96-101.000.

Berg, Niilo Nikodemus, to Rauma-Repola OY. Chipper. 4,109,690, Cl. 144-163.000.

Berg, Norman J.; Smith, Bob Lorin, deceased; and by Adams, Allen B., legal representative, to United States of America, Army. Acousto-optic real time correlator. 4,110,016, Cl. 350-358.000.

Berg, Walter: *See*—
Baumgartner, Alfons; Berg, Walter; Burkhardt, Horst; Laubin, Jurgen; and Schlick, Helmut, 4,110,828, Cl. 364-562.000.
Bergdahl, Knut. Heat exchange in ventilation installation. 4,109,705, Cl. 165-17.000.
Bergeron, David Leo; Putney, Zimri Congdon; and Stephens, Geoffrey Brownell, to International Business Machines Corporation. NPN/PNP Fabrication process with improved alignment. 4,110,126, Cl. 148-1.500.
Berghahn, Martha L.: *See*—
Berghahn, Walter G.; and Berghahn, Martha L., 4,109,785, Cl. 206-1.500.
Berghahn, Walter G.; and Berghahn, Martha L., to Bristol-Myers Company. Child resistant package. 4,109,785, Cl. 206-1.500.
Bergmann, Wilfried; and Knuttel, Berthold, to Kraftwerk Union Aktiengesellschaft. Method and apparatus for measuring the quantity of a fluid flowing through a pipe by means of nuclear magnetic spin resonance. 4,110,680, Cl. 324-0.50B.
Bergmans, Hendrik Jan; and Drabek, Rudolf, to U.S. Philips Corporation. Servo system for controlling the position of a magnetic head relative to a track to be followed using periodically interrupted long-wave positioning signals. 4,110,799, Cl. 360-70.000.
Berkelhammer, Gerald; and Kameswaran, Venkatamaran, to American Cyanamid Company. 2,2-Difluoro-1,3-benzodioxole-5-(α-alkyl)-acetic acids, and their use for the preparation of insecticides and acaricides. 4,110,345, Cl. 260-340.50R.
Berloty, Adrien. Reinforced foam building panel element. 4,109,436, Cl. 52-309.200.
Bernady, Karel Francis: *See*—
Floyd, Middleton Brawner, Jr.; Weiss, Martin Joseph; Poletto, John Frank; Schaub, Robert Eugene; and Bernady, Karel Francis, 4,110,368, Cl. 260-514.00D.
Bert, Alain; and Kantorowicz, Gerard, to Thomson-CSF. Non-volatile long memory for fast signals. 4,110,839, Cl. 365-180.000.
Bertram, James L.; and Shih, Pong Su, to Dow Chemical Company, The. Water-soluble epoxy resins and process for their preparation. 4,110,354, Cl. 260-348.140.
Berzen, Josef; and Theyssen, Johannes, to Ruhrchemie Aktiengesellschaft. Process for the manufacture of molded articles from polyolefins with molecular weights of at least one million. 4,110,391, Cl. 264-120.000.
Betensky, Ellis I., to Opcon Associates of Canada, Ltd. Triplet with aspheric surfaces. 4,109,995, Cl. 350-189.000.
Bethards, Charles William, to Motorola Inc. Adaptive audio compressor. 4,110,699, Cl. 328-168.000.
Bethlehem Steel Corporation: *See*—
Dresch, Charles D.; and Yohe, Robert A., 4,110,548, Cl. 13-16.000.
Beyer, Klaus Dietrich, to International Business Machines Corporation. Method for fabricating semiconductor devices. 4,110,125, Cl. 148-1.500.
Beylerian Limited: *See*—
Polvara, Giulio, 4,110,052, Cl. 403-295.000.
Bhatia, Shyam: *See*—
Rao, G. R. Mohan; Stanczak, John S.; Lien, Jih-Chang; and Bhatia, Shyam, 4,110,776, Cl. 357-23.000.
BHN Corporation: *See*—
Cottingham, Hugh V.; and Scrocco, Joseph, 4,110,506, Cl. 428-138.000.
BICC Limited: *See*—
Taylor, John Edward, 4,109,369, Cl. 29-467.000.
Bickel, Hans: *See*—
Woodward, Robert Burns; and Bickel, Hans, 4,110,533, Cl. 544-16.000.
Biedermann, Horst H.: *See*—
Bauer, Karl A.; Baur, Peter F.; Biedermann, Horst H.; Madel, Andreas; Nitsch, Friedrich; Pechinger, Ernst; Koenig, Walter; Ipfelkofer, Armin; Rindsfuesser, Johann J.; and Weber, Helmut, 4,109,779, Cl. 400-584.000.
Bigham, Eric C., to Pfizer Inc. Azidomethylarylacetic acids and esters thereof. 4,110,342, Cl. 260-332.20A.
Bijker, Anno: *See*—
Pons, Dick A.; and Bijker, Anno, 4,110,285, Cl. 260-29.6MP.
Bildstein, Siegfried; Lademann, Rudolf; Pietzsch, Siegfried; and Schaeffer, Georg, to Hoechst Aktiengesellschaft. Process for the manufacture of naphthalene-monosulfonic acids. 4,110,365, Cl. 260-505.00C.
Bill, David Hewitt. Structural section. 4,109,440, Cl. 52-721.000.
Bimm, Richard A.: *See*—
Barnett, Charles J.; Bimm, Richard A.; and Cullinan, George C., 4,110,330, Cl. 260-287.00B.
Bishov, Solomon J., to United States of America, Army. Method of stabilizing foods with an antioxidant. 4,110,483, Cl. 426-542.000.
BJ-Hughes Inc.: *See*—
Howard, James A.; and Smith, Roger, Jr., 4,109,800, Cl. 214-2.500.
Work, John Thompson, 4,109,488, Cl. 64-11.00R.
Bjorkqvist, Nils Gunnar; Franzen, Hans Arne Edgar; and Johansson, Karl Ingmar Wenzel, to AB Bofors. Device for bottom unit for projectile. 4,109,577, Cl. 102-35.600.
Black, Chester A.; and Black, Lester A. Detachable road protecting devices for tracked vehicles. 4,109,971, Cl. 305-51.000.
Black Clawson Company, The: *See*—
Couture, Joseph Walter, 4,109,872, Cl. 241-46.110.
Black, Lester A.: *See*—
Black, Chester A.; and Black, Lester A., 4,109,971, Cl. 305-51.000.
Blaimschein, Gottfried; and Marzy, Otto, to GFM Gesellschaft fur Fertigungstechnik und Maschinenbau Aktiengesellschaft. Tool assembly and inserted-tooth cutter for milling cylindrical surfaces on a workpiece. 4,110,055, Cl. 408-203.500.
Blank, Cecil G.: *See*—
Glenday, Martin J.; and Blank, Cecil G., 4,109,538, Cl. 74-6.000.
Blank, Werner Josef: *See*—
Schirmann, Peter Jude; and Blank, Werner Josef, 4,110,288, Cl. 260-29.4UA.
Blaser, Eugene Martin; and Conrad, Donald Adelbert, to International Business Machines Corporation. Depletion/enhancement mode FET logic circuit. 4,110,633, Cl. 307-205.000.
Blazick, Linda Ann; and Miller, Lewis Franklin, to International Business Machines Corporation. Method for preparing a multilayer ceramic. 4,109,377, Cl. 29-626.000.
Blessing, Hubert, to Levi Strauss & Co. Automatic stitching pattern control system for a sewing machine. 4,109,596, Cl. 112-121.110.
Block, Gerald H. Lightweight and compactible tent structure. 4,109,424, Cl. 52-2.000.
Bloom, Stanley M., to Polaroid Corporation. Anthraquinone compounds useful in photographic processes. 4,110,355, Cl. 260-372.000.
Blumbergs, John H.: *See*—
Finley, Joseph H.; Blumbergs, John H.; and Erickson, Clifford A., 4,110,074, Cl. 8-111.000.
Bocker, Richard P., to United States of America, Navy. Complex photodichroic spatial filter. 4,110,004, Cl. 350-162.0SF.
Boehm, Hans W.: *See*—
Oelke, Waldemar W.; Boehm, Hans W.; and Herrington, Richard A., 4,109,840, Cl. 225-2.000.
Boehmke, Gunther; Fries, Hermann; and Esch, Erich, to Bayer Aktiengesellschaft. Release agents. 4,110,119, Cl. 106-38.240.
Bogar, Jerry Hench; and Johnson, Tore Rudolf, to AMP Incorporated. Fiber optic connector. 4,110,000, Cl. 350-96.210.
Boggs, Daniel R.: *See*—
Brown, Richard I.; and Boggs, Daniel R., 4,109,852, Cl. 233-1.00R.
Bogri, Tibor: *See*—
Bagli, Jehan F.; and Bogri, Tibor, 4,110,468, Cl. 424-301.000.
Bogue Electric Manufacturing Company: *See*—
Rao, S. Chandrasekhara, 4,110,646, Cl. 310-163.000.
Bohm, Kurt; Rollenitz, Leopold; and Laurent, Francois, to Bolex International SA. Wide-angle attachment for varifocal objective. 4,110,005, Cl. 350-184.000.
Boise Cascade Corporation: *See*—
Kratochvil, John R., Jr., 4,109,876, Cl. 206-326.000.
Bolduc, Lee R.; and Dickhudt, Eugene A., to Population Research, Inc. Single stroke dispensing apparatus. 4,109,654, Cl. 128-235.000.
Bolenz, Klaus: *See*—
Odor, Frank; Mohr, Adolf; and Bolenz, Klaus, 4,110,718, Cl. 335-296.000.
Bolex International SA: *See*—
Bohm, Kurt; Rollenitz, Leopold; and Laurent, Francois, 4,110,005, Cl. 350-184.000.
Bolkow Gesellschaft mit beschrankter Haftung: *See*—
Peters, Johannes, 4,110,724, Cl. 340-4.00A.
Bolte, Wallace B.: *See*—
Kirschman, Fred C.; and Bolte, Wallace B., 4,110,170, Cl. 202-160.000.
Boltswitch, Inc.: *See*—
Erickson, John W.; and Erickson, James A., 4,110,584, Cl. 200-304.000.
Bond, Albert K.; Merrick, Edwin B.; and Nielsen, Larry Lee, to Hewlett-Packard Company. Perfusion meter. 4,109,643, Cl. 128-2.00L.
Bonitz, Eckhard: *See*—
Sander, Bruno; Bonitz, Eckhard; and Scherling, Kurt, 4,110,385, Cl. 264-13.000.
Booth, Frank B.: *See*—
Schaeffer, William D.; and Booth, Frank B., 4,110,404, Cl. 260-604.0HF.
Borg-Warner Corporation: *See*—
Wiese, Winfred John, 4,109,920, Cl. 277-17.000.
Bornengo, Mario, to Montedison S.p.A. One step process for preparing 2,6-dinitro-4-trifluoromethylchlorobenzene by nitration of 4-trifluoromethylchlorobenzene. 4,110,405, Cl. 260-646.000.
Boronkay, Attila D.; and Axen, Charles G., to Beckman Instruments, Inc. Operational amplifier with positive and negative feedback paths for supplying constant current to a bandgap voltage reference circuit. 4,110,677, Cl. 323-19.000.
Boros, Eugene Joseph; and Papa, Anthony Joseph, to Union Carbide Corporation. Methylol phosphonates and process for making same. 4,110,415, Cl. 260-953.000.
Borzym, Alexander, to Alpha Industries, Inc. Universal double cut die set. 4,109,555, Cl. 83-700.000.
Bosch, Juan, to Tecnologia Industrial, Proyectos Y Promociones, S.A. Sliding latch needle. 4,109,490, Cl. 66-120.000.
Bosch-Siemens Hausgerate GmbH: *See*—
Graf, Richard; Brodzina, Lieselotte; Strobele, Rudolf; and Stache, Helmut, 4,110,075, Cl. 8-137.000.
Bosniack, David S.; and Korbach, Paul F., to Exxon Research & Engineering Co. Conversion of sulfonic acids into a hydrocarbon oil of superior oxidation stability. 4,110,196, Cl. 208-13.000.
Bosso, Joseph F.; and Castellucci, Nicholas T., to PPG Industries, Inc. Cataphoretic N-heterocyclic-containing resins for electrodeposition. 4,110,287, Cl. 260-29.2EP.
Bottelsen, Walter Edward. Breakaway dart. 4,109,915, Cl. 273-106.50R.
Bottin, Jean: *See*—
Hubert, Jacques; Ory, Jean-Marie; Bottin, Jean; and Humbert, Claude, 4,110,741, Cl. 340-573.000.

Botton, Roger Jean, to Societe RHONE-PROGIL. Production of chlorine and ammonia. 4,110,423, Cl. 423-356.000.

Boucher, Donald Joseph, to International Standard Electric Corporation. Multi-frequency generator using digital technique. 4,110,567, Cl. 179-84.0VF.

Bourdon, Normand Charles, to Bendix Corporation, The. Polarizing and locking means for mateable units such as electrical connectors. 4,109,987, Cl. 339-75.00M.

Bovenkerk, Harold P., to General Electric Company. Rotary drill bit. 4,109,737, Cl. 175-329.000.

Bowser, George H.: *See—*
Mazzoni, Renato J.; and Bowser, George H., 4,109,431, Cl. 52-172.000.

Boyhont, Donald S.; and Solt, Paul E., to Fuller Company. Pneumatic conveying device. 4,109,966, Cl. 302-50.000.

Boys, John T., to Standard Pressed Steel Co. Apparatus for and method of determining rotational and linear stiffness. 4,110,829, Cl. 364-577.000.

Bradley Corporation: *See—*
Smart, William A., Jr.; and Gumm, Scott H., 4,109,895, Cl. 251-41.000.

Brambilla, Marco; and Lallia, Pascal, to United States of America, Energy. High-frequency plasma-heating apparatus. 4,110,595, Cl. 219-121.00P.

Bramlett, David A., to Sun Oil Company of Pennsylvania. Liquid level control system for separation tank. 4,110,215, Cl. 210-114.000.

Brandl, Gerhard. Reciprocable sprinkler. 4,109,866, Cl. 239-233.000.

Brauner, Arne H.: *See—*
Kipp, Michael A.; and Brauner, Arne H., 4,109,848, Cl. 229-21.000.

Braunwarth, John B., to Armstrong Chemical Co., Inc. Ampholytic quaternary ammonium compounds and methods for their preparation. 4,110,358, Cl. 260-404.500.

Brawner, William Howard: *See—*
Williams, Michael Patrick; and Brawner, William Howard, 4,109,925, Cl. 280-11.280.

Brecht, Robert R.: *See—*
Fairchild, Louis F.; and Brecht, Robert R., 4,109,742, Cl. 180-20.000.

Breitbard, Elford Barnett, to Tele-Quik, Inc. Telephone supported directory information support rack. 4,109,890, Cl. 248-452.000.

Breiter, Manfred W., to Electric Power Research Institute, Inc. Sodium-sulfur cell casing. 4,110,516, Cl. 429-104.000.

Brendle, Paul C.; and Clarkson, Brian B., to CTS Corporation. Variable resistance control. 4,110,722, Cl. 338-174.000.

Breslow, Jeffrey D.; and Jaworski, Eugene, to Marvin Glass & Associates. Pinball game with simultaneous projectors. 4,109,916, Cl. 273-121.00A.

Breuer, Bert, to Klockner-Humboldt-Deutz Aktiengesellschaft. Device for blocking the starting of vehicle engines with electric starter. 4,109,746, Cl. 180-82.00A.

Breuer, Hermann; and Treuner, Uwe, to E. R. Squibb & Sons, Inc. 3-Oxopyridazinylthiomethyl derivatives of ureidocephalosporins. 4,110,535, Cl. 544-21.000.

Brice, Henri, to Houilleres du Bassin de Lorraine. Process for the separation of tarry dusts from coke oven gas. 4,110,168, Cl. 201-4.000.

Briggs, Alan H.; and Timmons, Eric, to British Steel Corporation. Universally suspended snubbing railway axle truck. 4,109,586, Cl. 105-224.00A.

Brinkman, Richard John: *See—*
Shaw, Gordon Brian; and Brinkman, Richard John, 4,110,545, Cl. 13-6.000.

Bristol-Myers Company: *See—*
Berghahn, Walter G.; and Berghahn, Martha L., 4,109,785, Cl. 206-1.500.

British Gas Corporation: *See—*
Burge, Donald Richard, 4,109,636, Cl. 126-21.00A.

British Steel Corporation: *See—*
Briggs, Alan H.; and Timmons, Eric, 4,109,586, Cl. 105-224.00A.

Britton, James S.; and Morgan, David W., to Westinghouse Electric Corp. Watthour meter enclosure for use in remote meter reading packages. 4,110,814, Cl. 361-371.000.

Bro, Niels, to Bantex A/S. Method of producing a packing blank. 4,110,146, Cl. 156-291.000.

Broadbent, Sidney. Ice skate sharpening devices. 4,109,419, Cl. 51-94.00R.

Broadman, Richard J.; and May, Richard D., to Jones Instrument Corporation. Tachometer. 4,109,533, Cl. 73-498.000.

Brockelsby, Norman D.; and Haase, Reinhold A., to Dutton-Lainson Company. Oiler with adjustable spray nozzle. 4,109,869, Cl. 239-491.000.

Brockman, Gary; McFadden, Hubert J.; and Spector, George. Home battery storage and dispenser. 4,109,980, Cl. 312-35.000.

Brody, Thomas P.: *See—*
Asars, Juris A.; Davies, David H.; and Brody, Thomas P., 4,110,664, Cl. 315-169.0TV.

Brodzina, Lieselotte: *See—*
Graf, Richard; Brodzina, Lieselotte; Strobele, Rudolf; and Stache, Helmut, 4,110,075, Cl. 8-137.000.

Broerman, William E.: *See—*
Hughes, James L.; and Broerman, William E., 4,109,671, Cl. 137-282.000.

Brooks, Barlow W.; and Brooks, Barlow W., Jr., to Roll Forming Corporation. Roll forming apparatus and method. 4,109,499, Cl. 72-181.000.

Brooks, Barlow W., Jr.: *See—*
Brooks, Barlow W.; and Brooks, Barlow W., Jr., 4,109,499, Cl. 72-181.000.

Brooks, Ronald Robert, to RCA Corporation. GTO Ignition circuit. 4,109,632, Cl. 123-148.00E.

Brose, Albert F., to AMSTED Industries Incorporated. Frictionally snubbed railway car truck. 4,109,585, Cl. 105-197.0DB.

Brown, Charles V.: *See—*
Condarco, Jose G.; McClesky, John E.; Condarco, Pedro; and Brown, Charles V., 4,109,875, Cl. 241-101.700.

Brown, Harry W., to Cutler-Hammer, Inc. Grounded lever toggle switch. 4,110,585, Cl. 200-305.000.

Brown, Leon Calvin; Edwards, Earl Garland; Peterson, Charles Edwin; Robinson, Peter George; and Wilson, Clement Card, to International Business Machines Corporation. Hot roller fuser having manually operable jam clearance mechanism. 4,110,068, Cl. 432-60.000.

Brown, Paul L. Levitation toy and method of operation thereof. 4,109,413, Cl. 46-233.000.

Brown, Richard E.; and Unangst, Paul C., to Warner-Lambert Company. Indolopyrones having antiallergic activity. 4,110,464, Cl. 424-274.000.

Brown, Richard I.; and Boggs, Daniel R., to Baxter Travenol Laboratories, Inc. Centrifugal strain relief sheath for processing apparatus. 4,109,852, Cl. 233-1.00R.

Brown, Richard I., to Baxter Travenol Laboratories, Inc. Centrifugal apparatus with outer enclosure. 4,109,854, Cl. 233-25.000.

Brown, Richard I.; and Duffy, Joseph Kevin, to Baxter Travenol Laboratories, Inc. Drive system for centrifugal processing apparatus. 4,109,855, Cl. 233-25.000.

Brown, Roland H. Encapsulating device for gas cylinder. 4,109,692, Cl. 150-52.00R.

Brown & Root, Inc.: *See—*
Gracia, Bert E., 4,109,476, Cl. 61-87.000.
Gracia, Bert E., 4,109,478, Cl. 61-86.000.

Brown & Williamson Tobacco Corporation: *See—*
Hedge, Roger W., 4,109,664, Cl. 131-2.000.

Browning Arms Company: *See—*
Badali, Joseph A., 4,109,403, Cl. 42-75.00B.

Brunette, Bobbie: *See—*
Brunette, Frederick F., 4,109,797, Cl. 211-126.000.

Brunette, Frederick F., to Brunette, Bobbie, a part interest. Display assembly. 4,109,797, Cl. 211-126.000.

Brusaglino, Giampiero; and Savonuzzi, Giovanni, to FIAT Societa per Azioni. Propulsion unit for vehicles. 4,109,743, Cl. 180-65.00C.

Bryant, Clifford Aldene, to West Point-Pepperell, Inc. Mending yarn in the selvedge of tufted carpeting. 4,109,592, Cl. 112-79.00A.

Bryant, Nelson H.: *See—*
Powers, Whitney S., Jr.; Hobler, Ross L.; Bryant, Nelson H.; and Allen, Wilbur J., 4,109,511, Cl. 73-37.600.

Buchholz, Josef. Arrangement for fastening a steel dowel. 4,110,053, Cl. 403-361.000.

Buck, Robert. Electronic monitoring system. 4,110,678, Cl. 323-22.0SC.

Bucyrus-Erie Company: *See—*
Dummer, Robert E., 4,109,733, Cl. 173-4.000.

Buehler, Amsey; and Butcher, Kirk Thomas, to Canadian General Electric Company Limited. Mechanically locked bell and spigot coupling for ducts and method of forming. 4,110,144, Cl. 156-173.000.

Buehler, David W.: *See—*
Ruckriegel, Alfred E.; and Buehler, David W., 4,109,589, Cl. 108-63.000.

Buhl, Horst; and Will, Susanne, to Deutsche Automobilgesellschaft GmbH. Form retaining hydrogen-storing material. 4,110,425, Cl. 423-648.00R.

Bunch, Jesse C. Heliostat apparatus. 4,110,009, Cl. 350-292.000.

Bungert, Heinrich; Wenz, Herbert; and Wentz, Klaus, to Pfaff Industriemaschinen GmbH. Smoothing machine for stitch seams. 4,109,334, Cl. 12-59.500.

Bunker Ramo Corporation: *See—*
Bauerle, Gerhard, 4,109,993, Cl. 339-176.00M.

Burge, Donald Richard, to British Gas Corporation. Forced convection ovens. 4,109,636, Cl. 126-21.00A.

Burke, Frederick A.: *See—*
Long, Douglas A.; and Burke, Frederick A., 4,110,792, Cl. 358-240.000.

Burkhardt, Horst: *See—*
Baumgartner, Alfons; Berg, Walter; Burkhardt, Horst; Laubin, Jurgen; and Schlick, Helmut, 4,110,828, Cl. 364-562.000.

Burlington Industries, Inc.: *See—*
Roberts, Fred B., 4,109,492, Cl. 66-172.00E.

Burns, Milton Wayne: *See—*
Greenlee, Donald Roy; and Burns, Milton Wayne, 4,109,714, Cl. 166-53.000.

Burnside, Richard E. Protective device for storage tanks. 4,109,677, Cl. 137-586.000.

Burow, Burghard; and Klinkert, Norbert, to Barmag Barmer Maschinenfabrik Aktiengesellschaft. Yarn severing and holding apparatus. 4,109,357, Cl. 28-289.000.

Burroughs Corporation: *See—*
Drinkard, John Halmer, Jr.; and Walton, Charles Eugene, II, 4,109,553, Cl. 81-9.510.
Marino, Francis C., 4,110,748, Cl. 340-365.00C.
Wisner, Daniel A., 4,110,675, Cl. 318-606.000.

Burroughs Wellcome Co.: *See—*
Wilkinson, Samuel; Flower, Roderick John; and Ferreira, Sergio Henrique, 4,110,432, Cl. 424-85.000.

Burrus, Thomas William: *See—*
Amery, John Gordon; and Burrus, Thomas William, 4,110,784, Cl. 358-8.000.

Burton, Robert S., III, to Occidental Oil Shale, Inc. Method of breaking shale oil-water emulsion. 4,109,718, Cl. 166-256.000.

Buscher, Harold T.: *See—*
Leskovar, Branko; Buscher, Harold T.; and Kolbe, William F., 4,110,686, Cl. 324-58.50C.

Butcher, Kirk Thomas: *See—*
Buehler, Amsey; and Butcher, Kirk Thomas, 4,110,144, Cl. 156-173.000.

Buthe, Fritz, to Johannes Menschner Textilmaschinenfabrik. Fabric cropping machine. 4,109,352, Cl. 26-15.00R.

Butler-Newton, Inc.: *See—*
Horn, Berthold K. P., 4,110,621, Cl. 250-361.00R.

C.A.V. Limited: *See—*
Potter, James Charles, 4,109,629, Cl. 123-140.00R.

C.G.R. MeV: *See—*
Meunier, Jacques, 4,110,581, Cl. 200-153.0LA.

C. L. Frost & Son, Inc.: *See—*
Weis, Siegfried K.; and Van der Meulen, 4,109,343, Cl. 16-98.000.

CAF Industries: *See—*
Reed, Richard E., 4,109,604, Cl. 114-270.000.

Cagle, William S., to Standard Oil Company (Indiana). Sealing wells. 4,110,225, Cl. 252-8.5LC.

Cairns, James Anthony; Lurio, Allen; and Ziegler, James Francis, to International Business Machines Corporation. Method and apparatus for monitoring the dose of ion implanted into a target by counting emitted X-rays. 4,110,625, Cl. 250-492.00A.

Calentine, John W.: *See—*
Vandegaer, Jan E.; and Calentine, John W., 4,110,286, Cl. 260-29.2TN.

Calgon Corporation: *See—*
Barnett, Richard Earl; and Woodrum, Guy Thomas, 4,110,521, Cl. 526-64.000.

California Cedar Products Company: *See—*
Trinchera, Luigi, 4,110,591, Cl. 219-85.0CA.

California Polytechnic State University Foundation, The: *See—*
Wight, Hewitt G.; Call, Tracey G.; and Mortensen, Marvin L., 4,110,444, Cl. 424-226.000.

California Processing Machinery: *See—*
Silvestrini, Jesus Antonio, 4,109,570, Cl. 99-551.000.

Call, Tracey G.: *See—*
Wight, Hewitt G.; Call, Tracey G.; and Mortensen, Marvin L., 4,110,444, Cl. 424-226.000.

Callahan, John A.: *See—*
Ottenstein, Allan S.; and Callahan, John A., 4,109,777, Cl. 400-124.000.

Calland, John P.: *See—*
Parbhoo, Kantilal R.; Klink, Jerome P.; Calland, John P.; and White, Gerald L., 4,109,610, Cl. 118-202.000.

Camp, Terry L.: *See—*
Barecki, Chester J.; Lewis, Donald R.; and Camp, Terry L., 4,109,959, Cl. 297-216.000.

Canadian General Electric Company Limited: *See—*
Buehler, Amsey; and Butcher, Kirk Thomas, 4,110,144, Cl. 156-173.000.
Kemp, Grey Charles; and Spence, Eion Murray, 4,110,650, Cl. 310-239.000.
Lee, Harvey Robert, 4,110,159, Cl. 176-68.000.

Canadian Patents and Development Limited: *See—*
Kwok, Clyde C. K.; and Farag, Essam A., 4,109,834, Cl. 222-448.000.
Ooraikul, Buncha, 4,110,478, Cl. 426-262.000.

Canalizo, Carlos R., to Otis Engineering Corporation. Seal. 4,109,716, Cl. 166-191.000.

Candid Logic, Inc.: *See—*
Mueller, William L.; and Winkel, Robert J., 4,110,610, Cl. 250-231.0SE.
Tann, Lewis H.; Mueller, William L.; and Vis, Arthur D., 4,110,611, Cl. 250-237.00R.

Canon Kabushiki Kaisha: *See—*
Goshima, Yoshitomo; Hattori, Hiroyuki; Komaba, Shiro; and Umezawa, Kazumi, 4,110,029, Cl. 355-10.000.
Ikemori, Keiji, 4,110,006, Cl. 350-186.000.
Knechtel, Wilhelm, 4,110,030, Cl. 355-11.000.
Sato, Yasushi; and Ichihashi, Hiroo, 4,110,027, Cl. 355-3.0TR.

Canron, Inc.: *See—*
Stewart, John K., 4,109,388, Cl. 33-287.000.

Cantwell, John Burnett: *See—*
Dart, Edward Charles; Cantwell, John Burnett; Traynor, James Rodney; Jaworzyn, Joseph Franciszek; and Nemcek, Jozef, 4,110,184, Cl. 204-159.230.

Capelle, Anthony, to Chemische Fabriek Servo B.V. Crystallization inhibitor for paraffin. 4,110,283, Cl. 260-23.0AR.

Caravito, Vito A., to Goodyear Tire & Rubber Company, The. Method of making an integrally built and cured closed torus tire and wheel assembly. 4,110,141, Cl. 156-123.00R.

Carborundum Company, The: *See—*
Economy, James; Frechette, Francis J.; and Wohrer, Luis C., 4,110,277, Cl. 260-841.000.

Carl Schenck AG: *See—*
Altwein, Michael, 4,110,834, Cl. 364-841.000.

Carless, Capel & Leonard Limited: *See—*
Farmer, Thomas Henry, 4,110,204, Cl. 208-251.00R.

Carlessimo, John J. Circular type manholes. 4,109,425, Cl. 52-21.000.

Carlin, Joseph T.; Tyler, Timothy N.; Mills, Melvin E., Jr.; and Ware, James W., to Texaco Inc. Salinity tolerant surfactant oil recovery process. 4,110,229, Cl. 252-8.55D.

Carlin, Joseph T.: *See—*
Tyler, Timothy N.; Mills, Melvin E., Jr.; Wells, John A.; and Carlin, Joseph T., 4,110,228, Cl. 252-8.55D.

Carmet Company: *See—*
Schaffer, Dennis A., 4,109,502, Cl. 72-349.000.

Carpin, George E.: *See—*
Reed, Gerald M.; and Carpin, George E., 4,109,383, Cl. 32-10.00A.

Carr, Herbert, to General Motors Corporation. Moisture extractor. 4,109,487, Cl. 62-474.000.

Carre, Jean-Jacques, to Societe Anonyme D.B.A. Floating caliper disc brake and a guide key for the same. 4,109,764, Cl. 188-72.400.

Carrington, Russell Settle. Body profiled surgical drainage appliance. 4,109,657, Cl. 128-283.000.

Carson, Don B., to UOP Inc. Power generation from refinery waste heat streams. 4,109,469, Cl. 60-676.000.

Carson, Don B., to UOP Inc. Power generation and potable water recovery from salinous water. 4,110,174, Cl. 203-11.000.

Carter, Alan Reginald; Pettit, Donald; and Langerwerf, Josephus Sychbertus, to Shoe and Allied Trades Research Association, The. Improvements in shoe manufacture. 4,110,495, Cl. 427-400.000.

Carter, Harry R., to Carter Pol Development Corp. Practice ammunition device. 4,109,579, Cl. 102-41.000.

Carter Pol Development Corp.: *See—*
Carter, Harry R., 4,109,579, Cl. 102-41.000.

Casa Herrera, Inc.: *See—*
Herrera, Frank J.; and Ponce, Rodger G., 4,109,568, Cl. 99-477.000.

Cason, Robert L.; and McStay, John J., to United States of America, National Aeronautics and Space Administration. Apparatus including a plurality of spaced transformers for locating short circuits in cables. 4,110,683, Cl. 324-52.000.

Cassano, James R.: *See—*
Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., 4,109,903, Cl. 271-3.000.

Cassidy, James Lawrence. Method and means for reclaiming mechanical energy and hot condensate from exhaust steam. 4,109,470, Cl. 60-685.000.

Castellucci, Nicholas T.: *See—*
Bosso, Joseph F.; and Castellucci, Nicholas T., 4,110,287, Cl. 260-29.2EP.

Castine, Donald G., to Eaton Yale Ltd. Apparatus for processing trees. 4,109,689, Cl. 144-2.00Z.

Castro, Genaro Afalla. Device for dispensing measured quantities of material. 4,109,835, Cl. 222-449.000.

Castrodale, Daniel Owen; Lovgren, Jeffrey Lynn; Russell, Ralph Arthur; and Shidler, Karl Allen, to International Business Machines Corporation. Read/write and tunnel erase magnetic head assembly. 4,110,804, Cl. 360-118.000.

Cataldo, Thomas M.: *See—*
Pugh, Daniel B.; and Cataldo, Thomas M., 4,109,908, Cl. 272-119.000.

Caterpillar Tractor Co.: *See—*
Adams, Stanley B.; and Morge, Michael P., 4,109,812, Cl. 214-762.000.
Bartlett, Harold H.; Herr, Charles H., Jr.; and Lamport, Ivan R., 4,109,519, Cl. 73-135.000.
Habiger, Cyril W., 4,109,540, Cl. 74-96.000.
Jacobson, Paul D., 4,109,547, Cl. 74-526.000.
Junck, John A.; and Lorimor, Larry W., 4,109,561, Cl. 91-451.000.
Miller, Robert H.; and Davidson, Harold C., 4,109,628, Cl. 123-140.00R.
Ostrowski, Richard C.; and Styfhoorn, John, 4,110,150, Cl. 156-499.000.
Ping, David T., 4,109,744, Cl. 180-68.00P.
Richardson, Warner G., 4,109,400, Cl. 37-126.0AC.
Sieving, Alfred W.; and Stanley, James M., 4,109,963, Cl. 298-23.00M.

Cecil, Howard E.: *See—*
Kutik, Louis F.; and Cecil, Howard E., 4,109,832, Cl. 222-318.000.

Celanese Corporation: *See—*
Schaeffer, William D.; and Booth, Frank B., 4,110,404, Cl. 260-604.0HF.
Thomas, Norman W.; Berardinelli, Frank M.; and Edelman, Robert, 4,110,302, Cl. 260-40.00R.
Wells, William J., III; and Stautzenberger, Adin Lee, 4,110,298, Cl. 260-340.000.

Ceschoslovak akademie ved: *See—*
Stoy, Vladimir, 4,110,529, Cl. 528-491.000.

Cetec Corporation: *See—*
Balcom, Orville R.; Hildebrand, Cleve R.; and Pollard, Edward L., 4,109,389, Cl. 33-363.00K.

CGR-MeV: *See—*
Azam, Guy; and Perraudin, Claude, 4,110,623, Cl. 250-398.000.

CGS Systems, Inc.: *See—*
Medwin, Albert H., 4,110,701, Cl. 331-1.00A.

Chacornac, Georges, to Manufacture Francaise d'Armes et Cycles de Saint-Etienne Manufrance; and Institut Pasteur. Multi-penetration vaccination apparatus. 4,109,655, Cl. 128-253.000.

Chaffin, John H., III; and Skogman, Richard A., to Honeywell Inc. Preparation of low absorption transparent thallium iodide films on potassium chloride. 4,110,489, Cl. 427-164.000.

Chair-E-Yacht, Inc.: *See—*
Clark, Bobby Dean, 4,109,809, Cl. 214-505.000.

Chaki, Tomohiro: *See—*
Akutsu, Shoji; Watanabe, Yasumasa; Mashino, Yasuhiko; Chaki, Tomohiro; and Fujita, Masakazu, 4,110,048, Cl. 356-200.000.
Champeau, Andre. Bed having acoustical isolation. 4,109,331, Cl. 5-284.000.
Champion International Corporation: *See—*
Roccaforte, Harry I.; and Pasquale, William D., 4,109,786, Cl. 206-45.140.
Vincent, David N.; and Chang, Cheng Hsiung, 4,110,343, Cl. 260-335.000.
Chan, Ka-Kong; and Saucy, Gabriel, to Hoffmann-La Roche Inc. Tetramethyl chromanyl pentane derivatives. 4,110,346, Cl. 260-345.500.
Chang, Cheng Hsiung: *See—*
Vincent, David N.; and Chang, Cheng Hsiung, 4,110,343, Cl. 260-335.000.
Chapman, Leonard. Fluid control valve assembly. 4,109,678, Cl. 137-596.200.
Charbonnages de France: *See—*
Valantin, Alfred A., 4,109,473, Cl. 61-45.00D.
Chas. S. Tanner Co.: *See—*
Lindemann, Martin K., 4,110,289, Cl. 260-29.6TA.
Chemetron Corporation: *See—*
Hansen, Arne; and Troup, George, 4,109,726, Cl. 169-11.000.
Chemische Fabriek Servo B.V.: *See—*
Capelle, Anthony, 4,110,283, Cl. 260-23.0AR.
Chemische Werke Huls A.G.: *See—*
Graf, Richard; Brodzina, Lieselotte; Strobele, Rudolf; and Stache, Helmut, 4,110,075, Cl. 8-137.000.
Chemische Werks Huls A.G.: *See—*
Frese, Albert, 4,110,524, Cl. 526-158.000.
Chemprene, Inc.: *See—*
Stucke, Charles G., 4,109,924, Cl. 277-165.000.
Chen, Catherine S. H.: *See—*
Schwab, Frederick C.; Sheppard, Edward W.; and Chen, Catherine S. H., 4,110,232, Cl. 252-8.55B.
Chen, Tien Chi, to International Business Machines Corporation. Apparatus for the sorting of records overlapped with loading and unloading of records into a storage apparatus. 4,110,837, Cl. 364-900.000.
Cherdron, Egon: *See—*
Vogel, Walter, 4,110,209, Cl. 210-44.000.
Chesler, Edwin T.; Goodman, Donald; and Lapkin, Milton, to Olin Corporation. Vinyl chloride polymerization using selected amounts of air, oxygen or nitrogen. 4,110,527, Cl. 526-235.000.
Chevallier, Francois Edmond; and Fenouillet, Jean Marc Pierre, to Saint-Gobain Industries. Method for the manufacture of glass. 4,110,097, Cl. 65-136.000.
Chevron Research Company: *See—*
Edwards, Laroy H., 4,110,332, Cl. 260-299.000.
Magee, Philip S., 4,110,443, Cl. 424-212.000.
McDade, George Harold, 4,110,602, Cl. 219-523.000.
Offermann, Paul F., 4,110,599, Cl. 219-301.000.
Singer, Malcolm S., 4,110,475, Cl. 426-2.000.
Thompson, Don D., 4,109,522, Cl. 73-154.000.
Chiang, Mutong T.: *See—*
Danzig, Morris J.; and Chiang, Mutong T., 4,110,412, Cl. 260-873.000.
Chiba, Kunji: *See—*
Kobayashi, Akira; Chiba, Kunji; Miyamoto, Noriaki; Shiraki, Masao; and Furukawa, Naotake, 4,109,452, Cl. 57-58.890.
Kobayashi, Akira; Chiba, Kunji; Miyamoto, Noriaki; Shiraki, Masao; and Furukawa, Naotake, 4,109,453, Cl. 57-58.910.
Chicklis, Evan P., to Sanders Associates, Inc. Deep red laser. 4,110,702, Cl. 331-94.50F.
Chikul, Olga Semenovna: *See—*
Vorona, Dmitry Afanasievich; Chikul, Vitaly Ivanovich; Smirnov, Alexandr Stepanovich; Chikul, Olga Semenovna; Yagunov, Boris Ivanovich; Tager, Semen Alexandrovich; Shipkov, Nikolai Nikolaevich; Perepelkin, Arkady Vitalievich; Grigorieva, Elizaveta Alexeevna; Krasnovsky, Gennady Alexeevich, deceased; and Krasnovskaya, Tatyana Sergeevna, administratrix, 4,110,064, Cl. 431-171.000.
Chikul, Vitaly Ivanovich: *See—*
Vorona, Dmitry Afanasievich; Chikul, Vitaly Ivanovich; Smirnov, Alexandr Stepanovich; Chikul, Olga Semenovna; Yagunov, Boris Ivanovich; Tager, Semen Alexandrovich; Shipkov, Nikolai Nikolaevich; Perepelkin, Arkady Vitalievich; Grigorieva, Elizaveta Alexeevna; Krasnovsky, Gennady Alexeevich, deceased; and Krasnovskaya, Tatyana Sergeevna, administratrix, 4,110,064, Cl. 431-171.000.
Children's Hospital Medical Center: *See—*
Lagow, Richard J.; Shimp, Lawrence A.; and Clark, Leland C., Jr., 4,110,474, Cl. 424-350.000.
Chinoin Gyogyszer es Vegyeszeti Termekek Gyara Rt.: *See—*
Feuer, Laszlo; Furka, Arpad; Sebestyen, Ferenc; Hercsel nee Szepespataky, Jolan; and Bendefy nee Dobay, Erzsebet, 4,110,441, Cl. 424-211.000.
Chown, Martin, to International Telephone and Telegraph Corporation. Single optical fiber connector. 4,109,994, Cl. 350-96.210.
Chrysler Corporation: *See—*
Roy, Amedee; Belleau, Claude; and Geyman, James M., 4,110,512, Cl. 428-469.000.
Sarto, Jorma O., 4,110,416, Cl. 261-23.00A.
Swenson, Willard E., Jr., 4,109,515, Cl. 73-88.00A.
Ciba-Geigy: *See—*
Mollet, Hans; and Rehmann, Wolfgang, 4,110,073, Cl. 8-85.00R.
Ciba-Geigy AG: *See—*
Fahrni, Fritz; and Zimmermann, Anton, 4,109,611, Cl. 118-325.000.
Schaub, Andres; and Kogel, Gerhard, 4,110,071, Cl. 8-21.00R.
Ciba-Geigy Corporation: *See—*
Darms, Roland; Kvita, Vratislav; and Greber, Gerd, 4,110,188, Cl. 204-159.220.
Francis, John Elsworth, 4,110,457, Cl. 424-263.000.
Gilg, Bernard; Muller, Helmut; and Rody, Jean, 4,110,304, Cl. 260-45.80N.
Holt, Brian; and Randell, Donald Richard, 4,110,305, Cl. 260-45.80N.
Pickering, Timothy L.; and Hendrickson, James I., 4,110,294, Cl. 260-30.200.
Woodward, Robert Burns; and Bickel, Hans, 4,110,533, Cl. 544-16.000.
Cittrich, Jurgen: *See—*
Becker, Klaus; Cittrich, Jurgen; and Kaufmann, Karl-Ernst, 4,109,904, Cl. 272-56.50R.
Clark, Bobby Dean, to Chair-E-Yacht, Inc. Multiple position vehicle carrying trailer. 4,109,809, Cl. 214-505.000.
Clark, John Colin; Kennedy, James; Long, Alan Gibson; and Weir, Niall Galbraith, to Glaxo Laboratories Limited. Process for the preparation of 3-vinyl and substituted vinyl cephalosporins. 4,110,534, Cl. 544-16.000.
Clark, Justin S.; and Veasy, Lloyd George, to Primary Children's Hospital. Automated blood analysis system. 4,109,505, Cl. 73-1.00R.
Clark, Leland C., Jr.: *See—*
Lagow, Richard J.; Shimp, Lawrence A.; and Clark, Leland C., Jr., 4,110,474, Cl. 424-350.000.
Clark, Robert E., to Thexton Manufacturing Company. V-belt manipulating tool. 4,109,544, Cl. 74-242.700.
Clarkson, Brian B.: *See—*
Brendle, Paul C.; and Clarkson, Brian B., 4,110,722, Cl. 338-174.000.
Clavel, Raymond; and Menzi, Ulrich, to Hermes Precisa International S.A. Transmission mechanism, notably for typewriters. 4,109,778, Cl. 400-154.200.
Clayton, Thomas S., to General Electric Company. Coolant flow metering device. 4,109,864, Cl. 239-127.300.
Clerici, Mario Gabriele; Maspero, Federico; and D'Alfonso, Alfonso, to ANIC S.p.A. Process for the alkylation of secondary aliphatic amines in the presence of an amide of a transition metal. 4,110,377, Cl. 260-583.00R.
Clipson, Stuart A.; and Herolzer, Ralph H., to Midland-Ross Corporation. Nestable and stackable container assembly with improved bail structures of molded plastic. 4,109,791, Cl. 206-506.000.
Clow, Joseph Kenton. Pumping well blow-out preventer. 4,109,713, Cl. 166-53.000.
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Watkins, James F., 4,109,928, Cl. 280-411.00R.
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Coffey, Darius A. Sealing clamp for milk cartons and similar containers. 4,109,351, Cl. 24-258.000.
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Barnhurst, James Douglas; and Shumway, Durland Karl, 4,110,426, Cl. 424-46.000.
Gaffar, Abdul; and Friedman, Stuart D., 4,110,429, Cl. 424-54.000.
Colledge, Gary C. Branded plasterboard product. 4,110,507, Cl. 428-151.000.
Collins, John W., III, to Aluminum Company of America. Induction heat sealed containers. 4,109,815, Cl. 215-232.000.
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Rosso, John B., 4,109,526, Cl. 73-231.00R.
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Tigreat, Paul, 4,110,762, Cl. 354-4.000.
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Ffooks, Roger Cambridge; and Komada, Hiroshi, 4,109,823, Cl. 220-446.000.
Condarco, Jose G.; McClesky, John E.; Condarco, Pedro; and Brown, Charles V., to Continental Conveyor and Equipment Company. Module feeding apparatus. 4,109,875, Cl. 241-101.700.

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Conrac Corporation: *See—*
Guess, Joe F., 4,110,561, Cl. 179-2.0EA.
Conrad, Donald Adelbert: *See—*
Blaser, Eugene Martin; and Conrad, Donald Adelbert, 4,110,633, Cl. 307-205.000.
Consolidated Cigar Corporation: *See—*
Godfrey, Frederick D., Jr.; Fedro, John J.; and Sinclair, Robert I., 4,109,665, Cl. 131-15.00C.
Container Corporation of America: *See—*
Kipp, Michael A.; and Brauner, Arne H., 4,109,848, Cl. 229-21.000.
Conteas, Alexander P. X-ray film holder or cassette. 4,110,624, Cl. 250-481.000.
Continental Can Company, Inc.: *See—*
Shaw, Fred B., 4,109,441, Cl. 53-11.000.
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Goodwin, Thomas E.; and Starks, Charles M., 4,110,543, Cl. 568-781.000.
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Leach, Bruce E., 4,110,253, Cl. 252-457.000.
Martin, William L.; Wahl, Harry A.; and Young, Gary C., 4,109,719, Cl. 166-259.000.
Sifferman, Thomas R.; and Sparlin, Derry D., 4,110,275, Cl. 260-14.000.
Cook, Claren K.: *See—*
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Cooke, Claude E., Jr., to Exxon Production Research Company. Method of determining the orientation of hydraulic fractures in the earth. 4,109,717, Cl. 166-250.000.
Cooke, Horise M., to Stratoflex, Inc. Hose fitting assembly. 4,109,943, Cl. 285-149.000.
Cookson, Alan H., to Electric Power Research Institute, Inc. Extruded sheath section for compressed gas insulated transmission lines. 4,110,551, Cl. 174-27.000.
Cooper, David J.; Waitz, Jay Allan; Counelis, Mae; and Weinstein, Jay, to Schering Corporation. Amino glycoside antibiotics having antiprotozoal activity. 4,110,439, Cl. 424-181.000.
Cooper, Glenn Dale; and Floryan, Daniel Edwin, to General Electric Company. Molecular weight control of polyphenylene ethers. 4,110,311, Cl. 528-215.000.
Cooper Laboratories, Inc.: *See—*
Diamond, Julius, 4,110,328, Cl. 544-380.000.
Corbett, John M.; and Dechow, Frederick J., to Dow Chemical Company, The. Method for making crosslinked resin foams from an ethylenically unsaturated dicarboxylic acid anhydride and a polyisocyanate. 4,110,274, Cl. 521-157.000.
Cornelius, Kerry J. Plastic wall pool system. 4,109,324, Cl. 4-172.190.
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Cornu, Jozef; and Weisshaar, Erich, to BBC Brown Boveri & Company, Limited. Semiconductor power component. 4,110,780, Cl. 357-38.000.
Cory, Earl S.: *See—*
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Cottingham, Hugh V.; and Scrocco, Joseph, to BHN Corporation. Thermoplastic control complex. 4,110,506, Cl. 428-138.000.
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Couture, Joseph Walter, to Black Clawson Company, The. Pulping apparatus for liquid slurry stock. 4,109,872, Cl. 241-46.110.
CPC International Inc.: *See—*
Danzig, Morris J.; and Chiang, Mutong T., 4,110,412, Cl. 260-873.000.
Cramer, Robert L.; and Henneman, John W., to Bendix Corporation, The. Oxygen monitor and warning device for an aircraft breathing system. 4,109,509, Cl. 73-23.000.
Crawford, Peter Frederick: *See—*
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Creative Tool Company: *See—*
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Creutz, Hans-Gerhard, deceased (by Creutz, Katharina A., administratrix); and Herr, Roy Wilbur, to Oxy Metal Industries Corporation. Electrodeposition of copper. 4,110,176, Cl. 204-52.00R.
Creutz, Katharina A., administratrix: *See—*
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Cronin, Michael Joseph, to Lockheed Aircraft Corporation. Solid state power controller with low level signal control. 4,110,809, Cl. 361-95.000.
Cronshaw, David; Shemer, Jack E.; Turner, William D.; Hartke, David; Keddy, James R.; DuVall, Wilbur E.; and Sterling, Warren M., to Xerox Corporation. Soft display word processing system with multiple autonomous processors. 4,110,823, Cl. 364-200.000.
Crooks, Basil D.; and Bennett, R. Brian P., to Northern Telecom Limited. Welding gun adapted to weld movable contacts on wire spring relays. 4,110,593, Cl. 219-90.000.
Crosfield Electronics Limited: *See—*
Aughton, John E., 4,110,796, Cl. 358-298.000.
Isherwood, Jeffrey, 4,110,627, Cl. 250-561.000.
Cross, Leslie E.; and Newnham, Robert E., to United States of America, Navy. Method of making ferroelectric crystals having tailored domain patterns. 4,109,359, Cl. 29-25.350.
Crouse, William George, to International Business Machines Corporation. Noise reduction method and apparatus for companded delta modulators. 4,110,705, Cl. 332-11.00D.
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Turner, James E., 4,110,420, Cl. 264-41.000.
Csutor, Frank. Training and practice air of the turntable type, for use by ice skaters. 4,109,909, Cl. 272-146.000.
CTS Corporation: *See—*
Brendle, Paul C.; and Clarkson, Brian B., 4,110,722, Cl. 338-174.000.
Cuccolo, Sergio: *See—*
Roman, Alain; Sachetto, Jean-Pierre; Wust, Manfred; and Cuccolo, Sergio, 4,110,112, Cl. 96-1.0PC.
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Culpepper, William F.; and Hinkle, Charles G., to General Enterprises, Inc. Portable self-contained lubricating apparatus. 4,109,831, Cl. 222-254.000.
Cundiff, Otha G., Jr., to Raymond Lee Organization, Inc., The, a part interest. Emergency exit device. 4,109,759, Cl. 182-19.000.
Cunningham, William E., to Sullivan Company. Thermal protective barrier for open refrigerated compartment. 4,109,484, Cl. 62-256.000.
Curtin, Hoyt S. Pipe coupling. 4,109,944, Cl. 285-373.000.
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Waldbillig, James O.; Cusano, Carmen M.; Reed, David D.; and Winstead, Richard L., 4,110,235, Cl. 252-51.50R.
Cusick, Richard T.; and Fleagle, Wilbur J., to United States of America, Navy. Pressure responsive switch. 4,110,576, Cl. 200-82.00E.
Custom Cable Company: *See—*
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Cutler-Hammer, Inc.: *See—*
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Smith, Charles R., 4,110,720, Cl. 337-319.000.
Cybernet Electronic Corporation: *See—*
Kakigi, Takao, 4,110,690, Cl. 325-25.000.
Daeschler, Werner; and Rainer, Hans, to Linde Aktiengesellschaft. Process for the separation of a gaseous mixture consisting of water vapor, hydrocarbons, and air. 4,110,091, Cl. 62-54.000.
DAGMA Deutsche Automaten- und Getrankemaschinen- Gesellschaft mit beschrankter Haftung & Co.: *See—*
Kuckens, Alexander; and Kohl, Horst, 4,109,829, Cl. 222-81.000.
Dahl, Terence W.: *See—*
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Daily, Thomas Edward, to Fedders Corporation. Rotatable, non-tumbling drying rack. 4,109,397, Cl. 34-239.000.
Daimler-Benz Aktiengesellschaft: *See—*
Amann, Rolf; and Seidl, Horst, 4,109,955, Cl. 296-37.100.
Dyballa, Manfred; and Schutzenauer, Dieter, 4,109,517, Cl. 73-119.00A.
Hoheisel, Peter-Matthias; and Komander, Gerhard, 4,110,813, Cl. 361-248.000.
Dale, Anthony Richard: *See—*
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Clerici, Mario Gabriele; Maspero, Federico; and D'Alfonso, Alfonso, 4,110,377, Cl. 260-583.00R.
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Ratti, Franco; Vivarelli, Gianantonio; Maganza, Dario; and D'Amore, Emanuele, 4,109,379, Cl. 29-747.000.
Daniels, Leslie E., to Rotary Power Development Limited. Rotary piston power converting devices. 4,109,618, Cl. 123-43.00C.
Danzig, Morris J.; and Chiang, Mutong T., to CPC International Inc. Difunctional terminated macromolecular monomers and condensation copolymers produced therefrom. 4,110,412, Cl. 260-873.000.
Darden, Donald R. Brake actuating mechanisms for bicycles. 4,109,769, Cl. 192-5.000.
Darms, Roland; Kvita, Vratislav; and Greber, Gerd, to Ciba-Geigy Corporation. Crosslinkable mixtures of bis-imidyl derivatives. 4,110,188, Cl. 204-159.220.
Dart, Edward Charles; Cantwell, John Burnett; Traynor, James Rodney; Jaworzyn, Joseph Franciszek; and Nemcek, Jozef, to Imperial Chemical Industries Limited. Photocurable dental filling compositions. 4,110,184, Cl. 204-159.230.
Davidson, Harold C.: *See—*
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Davies, David H.: *See—*
Asars, Juris A.; Davies, David H.; and Brody, Thomas P., 4,110,664, Cl. 315-169.0TV.
Davies, Dennis, to International Computers Limited. Method of making an electrical connector. 4,109,378, Cl. 29-629.000.
Davis, David L.: *See—*
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Davis, Floyd William. Pistol structure. 4,109,559, Cl. 89-195.000.
Davis, Noel Bryant, to General Mills, Inc. Precision seeder and method. 4,109,824, Cl. 221-7.000.
Davis, Thomas G.: *See—*
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Davison, Sol: *See—*
Gergen, William P.; and Davison, Sol, 4,110,303, Cl. 260-42.180.
Davitian, Edward. Weaving system, method of weaving and apparatus. 4,109,355, Cl. 28-151.000.
Day, Edward J.: *See—*
Mitchell, James A. H.; and Day, Edward J., 4,109,938, Cl. 283-43.000.
Day, F. Howard, to Hooker Chemicals & Plastics Corp. Process for the preparation of benzoyl halide and halosulfonylbenzoyl halide. 4,110,373, Cl. 260-543.00R.
Day, Walter Ransom, Jr., to Litton Systems, Inc. Apparatus for coupling microwave energy from two oscillators to a common transmission line. 4,110,709, Cl. 333-6.000.
De Dietrich & Cie, S.A.: *See—*
Ruegg, Ernst, 4,109,853, Cl. 233-2.000.
De la Concha, Francisco. Reinforced separable sectional hermetic protective covering. 4,109,438, Cl. 52-630.000.
De Staat der Nederlanden, te Dezen Vertegenwoordigd Door de Directeur-Generaal der Posterijen, Telegrafie en Telefonie: *See—*
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Corbett, John M.; and Dechow, Frederick J., 4,110,274, Cl. 521-157.000.
Decker, Cloyd E., to Robertshaw Controls Company. Control system and method and control device therefor. 4,110,601, Cl. 219-506.000.
Deckert, Andreas; and Wolscheck, Hans, to Siemens Aktiengesellschaft. Installation of electrical components, particularly solid electrolytic capacitors in metal housings. 4,110,816, Cl. 361-433.000.
Decor, Jean-Pierre, to Rhone-Poulenc Industries. Process for the preparation of acetal sulphones. 4,110,538, Cl. 560-11.000.
Decubber, Maurice: *See—*
Serafin, Marian A.; and Decubber, Maurice, 4,109,860, Cl. 238-349.000.
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Kabele, Dennis Frederick, 4,109,751, Cl. 181-247.000.
Poore, Bernard Brandt, 4,109,772, Cl. 192-0.092.
Degner, Vernon R.; and Colbert, William V., to Envirotech Corporation. Dispersed gas flotation process. 4,110,210, Cl. 210-44.000.
DeLuca, Hector F.; and Jorgensen, Neal A., to Wisconsin Alumni Research Foundation. Method of treating milk fever in dairy cattle with 1,25-dihydroxycholecalciferol. 4,110,446, Cl. 424-236.000.
Demag A.G.: *See—*
Becker, Klaus; Cittrich, Jurgen; and Kaufmann, Karl-Ernst, 4,109,904, Cl. 272-56.50R.
Demmler, Kurt; Lawonn, Horst; and Hesse, Anton, to BASF Aktiengesellschaft. Manufacture of molding compositions based on unsaturated polyester resins. 4,110,278, Cl. 260-17.00A.
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Yagi, Norio; Matsumura, Hideki; Aoyagi, Tatsuhiro; and Kishi, Ikuji, 4,110,314, Cl. 528-26.000.
Denki Onkyo Co., Ltd.: *See—*
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Denninger, Claude, to Sogemaric, Societe de Gestion et de Marketing pour Industries de Consommation; and Societe E. Lacroix. Pyrotechnical mole trap. 4,109,406, Cl. 43-84.000.
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Denzel, Theodor; and Hoehn, Hans, to E. R. Squibb & Sons, Inc. 8H-pyrazolo[4',3':5,6]pyrido [3,4-e][1,2,4]triazolo-[1,5-a]pyrimidines. 4,110,454, Cl. 424-251.000.
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DesMarais, Thomas A., to Procter & Gamble Company, The. Polyester foam materials. 4,110,276, Cl. 521-123.000.
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DeTorre, Robert P., to PPG Industries, Inc. Apparatus for opening score lines in glass sheets. 4,109,841, Cl. 225-96.500.
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Krohn, Hans Guenther; Rademacher, Friedrich; Petri, Ulrich; and Deubel, Hans D., 4,109,446, Cl. 53-282.000.
Deutsche Automobilgesellschaft GmbH: *See—*
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Sebald, Franz X.; and Hagemann, Hans-Dieter, 4,109,471, Cl. 61-0.500.
Devico, Michael: *See—*
Hillman, Gary; and Devico, Michael, 4,109,337, Cl. 15-21.00D.
Devine, Patrick J., to United States of America, Army. Armor plate penetrator. 4,109,580, Cl. 102-52.000.
Dewaele, Sylvain A. R., to s.a. Texaco Belgium n.v. Conversion of 2-dialkylamino-3H-azepines into epsilon caprolactams. 4,110,323, Cl. 260-239.30A.
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de Zarauz, Yves, to Compagnie Generale des Etablissements Michelin. Polymerization process. 4,110,525, Cl. 526-177.000.
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Diamond, Julius, to Cooper Laboratories, Inc. Bis-carbamylguanidinoazaalkane antimicrobial compounds. 4,110,328, Cl. 544-380.000.
Diamond Shamrock Corporation: *See—*
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Diamond, Steven M.: *See—*
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Dickhudt, Eugene A.: *See—*
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Dieck, Ronald L.; and Magnusson, Alan B., to Armstrong Cork Company. Catalytic process for the preparation of phosphazene polymers. 4,110,421, Cl. 423-300.000.
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Dietrich, Ursula. Toothbrush with curved handle. 4,109,339, Cl. 15-167.00R.
Difley, Charles Rogers; and McDonald, William Roy, to Whirlpool Corporation. Refuse compaction method. 4,109,571, Cl. 100-35.000.
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Dijkmans, Eise Carel, to U.S. Philips Corporation. Feeding bridge. 4,110,636, Cl. 307-237.000.
DiLiddo, Ronald C.; and King, Dallas E., to General Motors Corporation. Method of manufacturing a circuit breaker assembly or the like. 4,109,376, Cl. 29-622.000.
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Dischert, Robert Adams; and Walter, James Morgan, to RCA Corporation. Clock generator for video signal processing. 4,110,785, Cl. 358-19.000.
Dix, Kurt, to G. Wolf Jr. Kommanditgesellschaft. Sealing closure for an opening of a coking oven. 4,110,173, Cl. 202-248.000.
Dobija, Michael J., to Masonite Corporation. Tub surround. 4,109,426, Cl. 52-35.000.
Dr. Ernst Fehrer Gesellschaft m.b.H. & Co. K.G. Textilmaschinenfabrik u. Stahlbau: *See—*
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Dr. Johannes Heidenhain GmbH: *See—*
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Donato, Giuseppe. Apparatus for determining the amount and location of unbalance in a rotating wheel of a vehicle. 4,109,532, Cl. 73-457.000.
Dooley, Joseph L.; and Yelke, Edward, to Creative Tool Company. Engine monitoring apparatus. 4,109,518, Cl. 73-119.00A.
Dorian, Hubert J. Dental tools. 4,109,384, Cl. 32-40.00R.
Dorrance, William Thomas; and Wilson, William Richard, to General Dynamics Corporation Electronics Division. Navigation system and

method for determining the position of an ocean mining ship. 4,110,726, Cl. 340-6.00R.

Dorschner, Terry A.: *See*—
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Dotson, James D.; and Jones, Annette. Indoor automobile starting system. 4,110,629, Cl. 290-38.00R.

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Dow Chemical Company, The: *See*—
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Goode, John V., Jr., 4,109,527, Cl. 73-343.500.
Greenawalt, Eddie Lee; and Geren, Lorenzo Dow, 4,109,792, Cl. 206-525.000.
McGregor, Stanley D., 4,110,104, Cl. 71-94.000.
Nelson, Donald L.; and Herbert, Norman T., 4,110,279, Cl. 260-19.00R.

Dowd, James D.: *See*—
Whetstone, Clayton N.; Koop, Douglas A.; and Dowd, James D., 4,109,374, Cl. 29-599.000.

Dowty Mining Equipment Limited: *See*—
Harris, Robert Graham, 4,109,472, Cl. 61-45.00D.

Drabek, Rudolf: *See*—
Bergmans, Hendrik Jan; and Drabek, Rudolf, 4,110,799, Cl. 360-70.000.

Dreer, Gottfried. Process for the manufacture of fillers from solid waste. 4,110,281, Cl. 260-22.00A.

Dresch, Charles D.; and Yohe, Robert A., to Bethlehem Steel Corporation. Water-cooled electrode holder. 4,110,548, Cl. 13-16.000.

Dresser Industries, Inc.: *See*—
Gorgens, Joseph E.; and Morris, Matthew Gerald, Jr., 4,109,537, Cl. 73-756.000.
Greenlee, Donald Roy; and Burns, Milton Wayne, 4,109,714, Cl. 166-53.000.
Miller, Gerald Adrian; and Zabsky, John Mitchell, 4,109,756, Cl. 181-266.000.
Youmans, Arthur H., 4,109,521, Cl. 73-151.000.

Dreulle, Noel: *See*—
Longuepee, Michel; and Dreulle, Noel, 4,110,127, Cl. 148-6.15Z.

Dreulle, Paule; Longuepee, Michel; and Dhaussy, Dominique, to International Lead Zinc Research Organization, Inc. Solution and procedure for depositing a protective coating on galvanized steel parts, and solution regeneration procedure. 4,110,128, Cl. 148-6.15Z.

Drinkard, John Halmer, Jr.; and Walton, Charles Eugene, II, to Burroughs Corporation. Semiautomatic twisted wire cable stripper. 4,109,553, Cl. 81-9.510.

Drouin, Claude, to Les Industries BFG Limitee. Latch mechanism for pyrolytic range. 4,109,637, Cl. 126-197.000.

Drummond, James C.; and Hughes, Lawrence J., to Monsanto Company. Preparation of dihydroxydiphenyl alkanes. 4,110,542, Cl. 568-729.000.

DSO "Cherna Metalurgia": *See*—
Peev, Vassil Georgiev; Valchev, Alexander Yordanov; and Bakalov, Nikolay Georgiev, 4,110,547, Cl. 13-11.000.

Dubil, James F.; Leighton, Howard N.; and Wilfinger, Raymond J., to International Business Machines Corporation. Bucket brigade circuit for signal scaling. 4,110,835, Cl. 364-844.000.

Dubois, Jean Claude: *See*—
Abert-Mellah, Marie Annick; Dubois, Jean Claude; and Zann, Annie, 4,110,243, Cl. 252-299.000.

Ducol, Jean-Paul; Gobry, Dominique; Raisin, Jean-Pierre; and Agence Nationale de Valorisation de la Recherche (ANVAR), to Institut Textile de France. Multidifferential device. 4,109,595, Cl. 112-121.110.

Duddy, Joseph C.; and Hein, Edward R., to ESB Ray-O-Vac Management Corporation. Method for making storage battery grid from lead-tin-zinc alloy. 4,109,358, Cl. 29-2.000.

Duembgen, Gerd: *See*—
Engelbach, Heinz; Krabetz, Richard; Duembgen, Gerd; Willersinn, Carl-Heinz; Frey, Walter; Lebert, Ulrich; and Thiessen, Fritz, 4,110,370, Cl. 260-530.00N.

Duffy, Joseph Kevin: *See*—
Brown, Richard I.; and Duffy, Joseph Kevin, 4,109,855, Cl. 233-25.000.

Dujardin, Francois: *See*—
Sluse, Guy; and Dujardin, Francois, 4,110,181, Cl. 204-147.000.

Dummer, Robert E., to Bucyrus-Erie Company. Tilt preventing system for drills. 4,109,733, Cl. 173-4.000.

Dunkl, Franz S.: *See*—
Ross, Sidney D.; and Dunkl, Franz S., 4,110,817, Cl. 361-433.000.

Dunn, Terry: *See*—
Williams, Joel; Dunn, Terry; and Stannett, Vivian, 4,110,185, Cl. 204-159.200.

Dunning, Richard E.; and Nelson, Marshall A., to Avery Products Corporation. Embossing roller and apparatus. 4,110,152, Cl. 156-553.000.

Du Pont de Nemours, E. I., and Company: *See*—
Edging, Robert Ray; and Lee, Lien-Mow, 4,110,316, Cl. 526-68.000.
Evans, Robert Franklin, 4,109,991, Cl. 339-99.00R.
Fremont, Joseph Melvin, 4,110,249, Cl. 252-431.00R.
Fugitt, Robert Benson; and Schwing, Gregory Wayne, 4,110,473, Cl. 424-331.000.
Lauder, Alan; and McCann, Elrey L., III, 4,110,251, Cl. 252-442.000.
Lauder, Alan, 4,110,254, Cl. 252-462.000.
Lauder, Alan, 4,110,258, Cl. 252-468.000.
Moore, Edward Joseph; and Owens, John Edward, 4,110,810, Cl. 361-213.000.
Mouissie, Bob, 4,109,986, Cl. 339-17.00L.
Secor, Robert Miller, 4,110,491, Cl. 427-212.000.
Vaughan, Lawrence G., 4,110,353, Cl. 260-369.000.
Vladuchick, Susan Anne, 4,110,335, Cl. 260-302.00S.

Durket, Michael P. Book holder for student's desk. 4,109,889, Cl. 248-447.000.

Durst, Felix. Hot water floor heater. 4,109,859, Cl. 237-69.000.

Dutton-Lainson Company: *See*—
Brockelsby, Norman D.; and Haase, Reinhold A., 4,109,869, Cl. 239-491.000.

DuVall, Wilbur E.: *See*—
Cronshaw, David; Shemer, Jack E.; Turner, William D.; Hartke, David; Keddy, James R.; DuVall, Wilbur E.; and Sterling, Warren M., 4,110,823, Cl. 364-200.000.

Dwek, Abraham. Garment hanger. 4,109,838, Cl. 223-91.000.

Dyballa, Manfred; and Schutzenauer, Dieter, to Daimler-Benz Aktiengesellschaft. Method and apparatus for controlling the correct angular adjustment of periodic injection operations. 4,109,517, Cl. 73-119.00A.

Dzhashi, Avtandil Vladimirovich: *See*—
Pirkulov, Vladimir Georgievich; Askarov, Mikhail Arkadievich; and Dzhashi, Avtandil Vladimirovich, 4,110,241, Cl. 252-182.100.

E. J. Price (Developments) Limited: *See*—
Price, Ernest James, 4,109,676, Cl. 137-550.000.

E. R. Squibb & Sons, Inc.: *See*—
Breuer, Hermann; and Treuner, Uwe, 4,110,535, Cl. 544-21.000.
Denzel, Theodor; and Hoehn, Hans, 4,110,454, Cl. 424-251.000.
Rovnyak, George C.; and Vogt, B. Richard, 4,110,452, Cl. 424-251.000.
Wade, Peter C.; and Vogt, B. Richard, 4,110,449, Cl. 424-250.000.

E. W. Buschman Company, The: *See*—
Vogt, Robert K., 4,109,783, Cl. 198-781.000.

Easter, Holton C.; Matrinetz, Frank F.; and Myers, Ted L., to Inland Steel Company. Mounting assembly for rolling mill guide box. 4,109,972, Cl. 308-3.00R.

Eastman Kodak Company: *See*—
Albers, Kenneth H.; and Wright, Howard N., Jr., 4,110,539, Cl. 560-240.000.
Farley, Ronald William; and Smith, Donald Luke, 4,110,026, Cl. 355-3.00R.
Kindig, Guilford Edwin, 4,110,771, Cl. 354-207.000.
Merry, J. Bradford, 4,110,788, Cl. 358-63.000.
Schaeffer, James R.; Minsk, Louis M.; and Stevens, Richard E., 4,110,079, Cl. 23-253.0TP.
Sloan, Cephas H.; and Pacifici, James G., 4,110,187, Cl. 204-159.190.
Tygart, Robert Carl, 4,109,365, Cl. 29-421.00R.
Zannucci, Joseph S.; and Hedberg, David G., Jr., 4,110,301, Cl. 260-40.00P.

Eaton Corporation: *See*—
Goetz, George W., 4,109,578, Cl. 102-39.000.
Jarocha, William M.; and O'Neil, Walter K., 4,110,732, Cl. 340-58.000.
Johnson, Oliver Wendell, 4,109,679, Cl. 137-596.130.
Paskert, Joseph H., 4,109,693, Cl. 151-41.750.

Eaton Yale Ltd.: *See*—
Castine, Donald G., 4,109,689, Cl. 144-2.00Z.

Ebauches S.A.: *See*—
Laesser, Claude; and Portmann, Hubert, 4,109,457, Cl. 58-43.000.
Laesser, Claude, 4,110,744, Cl. 340-336.000.
Rusznyak, Andreas, 4,110,637, Cl. 307-238.000.

Ebeling, Charles E., Jr., to United States of America, Navy. Two-position nozzle. 4,109,867, Cl. 239-265.150.

Ebelt, Gunter, to Maschinenfabrik Gluckauf Beukenberg G.m.b.H. Automatic honing machine and method. 4,109,418, Cl. 51-34.00F.

Eberle, William J., to General Battery Corporation. Automatic air leak testing apparatus and method. 4,109,793, Cl. 209-74.00R.

Ebi, Yutaka; and Saitou, Masatoshi, to Ricoh Company, Ltd. Electrostatic copying apparatus. 4,110,031, Cl. 355-14.000.

Eckels, Robert E. Shaped charge with enhanced penetration. 4,109,576, Cl. 102-24.0HC.

Economy, James; Frechette, Francis J.; and Wohrer, Luis C., to Carborundum Company, The. Nylon modified phenolic resin fibers. 4,110,277, Cl. 260-841.000.

Edelman, Robert: *See*—
Thomas, Norman W.; Berardinelli, Frank M.; and Edelman, Robert, 4,110,302, Cl. 260-40.00R.

Eden, Richard C.; and Nakano, Kenichi, to United States of America, Air Force. Narrow-band inverted homo-heterojunction avalanche photodiode. 4,110,778, Cl. 357-30.000.

Eden, Richard C.: *See*—
Harris, James S., Jr.; Eden, Richard C.; Cory, Earl S.; and Scholl, Fred W., 4,110,661, Cl. 313-499.000.
Edging, Robert Ray; and Lee, Lien-Mow, to Du Pont de Nemours, E. I., and Company. Process for preparing poly(ethylene terephthalate). 4,110,316, Cl. 526-68.000.
Edick, John D.; and Ostrander, Kenneth A., to Reliance Electric Company. Dynamoelectric machine and tachometer. 4,110,676, Cl. 322-31.000.
Edwards, Earl Garland: *See*—
Brown, Leon Calvin; Edwards, Earl Garland; Peterson, Charles Edwin; Robinson, Peter George; and Wilson, Clement Card, 4,110,068, Cl. 432-60.000.
Edwards, Laroy H., to Chevron Research Company. 1-Triorganostannyl-3-organothio-4-substituted-1,2,4-delta$^2$-triazolidin-5-ones. 4,110,332, Cl. 260-299.000.
Ege, Sigmund, to Kloften & Kloften A/S. Method of splicing tape by soldering. 4,110,592, Cl. 219-85.00M.
Egli, Alwin, to SIG Schweizerische Industrie-Gesellschaft. Package composed of an inner bag enclosed by an outer container. 4,109,822, Cl. 220-404.000.
Ehrenfruend, Herbert A., to Olefoam Corporation. Method of making polyethylene foam. 4,110,269, Cl. 521-81.000.
Eiland, P. Frank: *See*—
Spanel, Abram N.; Eiland, P. Frank; Jacobs, David R.; and Ziegler, Geza C., 4,109,594, Cl. 112-79.00R.
Eilerman, Robert G.: *See*—
Willis, Brian J.; Fischetti, Frank, Jr.; and Eilerman, Robert G., 4,109,662, Cl. 131-2.000.
Eisert, Wolfgang, to Gesellschaft fur Strahlen- und Umweltforschung mbH, Munchen. Apparatus for counting and classifying particles. 4,110,043, Cl. 356-102.000.
Eitel, Fredrick G., to United Technologies Corporation. Lightweight cooled laser mirror. 4,110,013, Cl. 350-310.000.
Ek, Birger Henrik; and Stenudd, Sven Gunnar Valter, to Facit Aktiebolag. Apparatus for marking an information carrying medium. 4,109,776, Cl. 400-124.000.
Ekstedt, Edward E.; Beck, Edwin J., Jr.; Bahr, Donald W.; and Weinstein, Barry, to General Electric Company. Double walled impingement cooled combustor. 4,109,459, Cl. 60-39.660.
Electric Machinery Mfg. Co.: *See*—
Ernst, Richard G.; and Medved, Charles W., 4,109,978, Cl. 308-237.00R.
Electric Power Research Institute, Inc.: *See*—
Breiter, Manfred W., 4,110,516, Cl. 429-104.000.
Cookson, Alan H., 4,110,551, Cl. 174-27.000.
Electric Vehicle Corporation of America: *See*—
Mas, Joseph A., 4,110,649, Cl. 310-191.000.
Electricity Council, The: *See*—
Gale, Philip Franklin, 4,110,684, Cl. 324-52.000.
Electro-Food AB: *See*—
Vigerstrom, Knut Birger, 4,109,566, Cl. 99-358.000.
Electronics Corporation of America: *See*—
Thomson, Elihu Craig, 4,110,608, Cl. 250-214.00A.
Elektriska Svetsningsaktiebolaget: *See*—
Nicholson, Frederick, 4,110,514, Cl. 428-683.000.
Eli Lilly and Company: *See*—
Bach, Nicholas J.; and Kornfeld, Edmund C., 4,110,339, Cl. 260-326.900.
Barnett, Charles J.; Bimm, Richard A.; and Cullinan, George C., 4,110,330, Cl. 260-287.00B.
Benefiel, Robert Lee; and Krumkalns, Eriks Viktors, 4,110,099, Cl. 71-76.000.
Holmes, Richard E., 4,110,465, Cl. 424-274.000.
Nakatsukasa, Walter M.; and Hamill, Robert L., 4,110,435, Cl. 424-122.000.
Nakatsukasa, Walter M.; and Hamill, Robert L., 4,110,436, Cl. 424-122.000.
Elkamet/Lahn Kunststoff GmbH/Werk: *See*—
Giehler, Herbert; and Grau, Wilfried, 4,110,389, Cl. 264-89.000.
Elliott, Charles Anthony; and Huff, Larry Dean, to RCA Corporation. Package actuated record extracting mechanism for a video disc player. 4,109,919, Cl. 274-9.00B.
Elmore, Theodore V. Heating device. 4,110,597, Cl. 219-200.000.
Elswood, Ebbert Lee, to Bell & Howell Company. Vibration transducer with improved viscous damping. 4,110,731, Cl. 340-17.00R.
Eltra Corporation: *See*—
Kerfante, Rene, 4,110,763, Cl. 354-14.000.
Emerson Electric Co.: *See*—
Roddy, Joseph T., 4,110,644, Cl. 310-91.000.
Emmel, Ludwig: *See*—
Mildenberger, Hilmar; Stahler, Gerhard; and Emmel, Ludwig, 4,110,336, Cl. 260-307.00G.
Endo, Hiroshi, to Nissan Motor Company, Limited. Detection of angular displacement to an object from the moving vehicle. 4,110,754, Cl. 343-16.00R.
Endruscheit, Peter: *See*—
Wilhelm, Gerhard; Hockenberger, Lothar; Soyka, Manfred; and Endruscheit, Peter, 4,110,295, Cl. 260-30.40R.
Eneman, Melvin, to United States of America, Army. Projectile fuze. 4,109,583, Cl. 102-244.000.
Engelbach, Heinz; Krabetz, Richard; Duembgen, Gerd; Willersinn, Carl-Heinz; Frey, Walter; Lebert, Ulrich; and Thiessen, Fritz, to BASF Aktiengesellschaft. Method of separating high-boiling or non-volatile materials. 4,110,370, Cl. 260-530.00N.
Engelhard Minerals & Chemicals Corporation: *See*—
Robertson, Allen R.; and Hill, James S., 4,110,124, Cl. 136-236.00R.
Engins Matra: *See*—
Deplante, Michel; and Minesi, Didier, 4,110,672, Cl. 318-254.000.
English Clays Lovering Pochin & Company Limited: *See*—
Watson, James Henry Peter, 4,110,222, Cl. 210-222.000.
Enomoto, Minoru, to Toyoda-Koki Kabushiki Kaisha. Programmable feed control apparatus for a machine tool. 4,110,674, Cl. 318-571.000.
Envirotech Corporation: *See*—
Degner, Vernon R.; and Colbert, William V., 4,110,210, Cl. 210-44.000.
Erickson, Clifford A.: *See*—
Finley, Joseph H.; Blumbergs, John H.; and Erickson, Clifford A., 4,110,074, Cl. 8-111.000.
Erickson, Frederick L. High displacement-to-size ratio orbiting fluid mechanism. 4,110,060, Cl. 417-462.000.
Erickson, James A.: *See*—
Erickson, John W.; and Erickson, James A., 4,110,584, Cl. 200-304.000.
Erickson, John W.; and Erickson, James A., to Boltswitch, Inc. Load break switch with transparent internal shield. 4,110,584, Cl. 200-304.000.
Erikson, Rolf B.: *See*—
Johnson, Delmar R.; Flint, John R.; Wells, Thomas R.; Erikson, Rolf B.; and Rady, Bruce A., 4,110,020, Cl. 353-26.00A.
Eriksson, Leif, to Svenska Traforskningsinstitutet. Method and means for measuring web tension in paper or foils. 4,109,520, Cl. 73-143.000.
Eriksson, Lennart: *See*—
Pettersson, Torulf; Fladda, Gerdt; and Eriksson, Lennart, 4,110,044, Cl. 356-103.000.
Eriksson, Raimo: *See*—
Lautjarvi, Jaakko; and Eriksson, Raimo, 4,109,898, Cl. 266-217.000.
Ernest, Robert P., to Ford Motor Company. Controlled flow cooling system for low weight reciprocating engine. 4,109,617, Cl. 123-41.740.
Ernst Leitz Wetzlar GmbH: *See*—
Leitz, Ludwig, 4,110,042, Cl. 356-4.000.
Ernst, Richard G.; and Medved, Charles W., to Electric Machinery Mfg. Co. Electrically insulated sleeve bearing and method of making same. 4,109,978, Cl. 308-237.00R.
Ersoy, Kadri Okan, to Sentralinstitutt for Industriell Forskning. Method for producing a synthetic hologram. 4,109,996, Cl. 350-3.660.
ESB Ray-O-Vac Management Corporation: *See*—
Duddy, Joseph C.; and Hein, Edward R., 4,109,358, Cl. 29-2.000.
Esch, Erich: *See*—
Boehmke, Gunther; Fries, Hermann; and Esch, Erich, 4,110,119, Cl. 106-38.240.
Escher, Balint: *See*—
Frade, Gilbert; Escher, Balint; and Prince, Dominique, 4,110,815, Cl. 361-433.000.
Escher Wyss Limited: *See*—
Stotz, Wolf-Gunter; and Hund, Helmut, 4,110,156, Cl. 162-305.000.
Eslinger, Ralph Gilbert; and Nicolson, John Millar, to Bendix Corporation, The. Wheel speed sensor. 4,110,647, Cl. 310-168.000.
Esser, Gustav, to Oswald Forst Maschinenfabrik und Apparatebauanstalt GmbH. Horizontal external broaching machine. 4,109,560, Cl. 90-96.000.
Esser, Leonard Jan Maria; and Theunissen, Matthias Johannes Joseph, to U.S. Philips Corporation. Charge-coupled device. 4,110,777, Cl. 357-24.000.
Estabrook, Mark R.: *See*—
Marriott, Roger; and Estabrook, Mark R., 4,110,218, Cl. 210-223.000.
Estaque, Andre Fernand, to Societe Anonyme Automobile Citroen. Elastic coupling. 4,109,979, Cl. 308-238.000.
Evans, Dafydd W., to Towmotor Corporation. Steering apparatus. 4,109,748, Cl. 180-141.000.
Evans, Robert Franklin, to Du Pont de Nemours, E. I., and Company. Self-stripping electrical connector and terminal. 4,109,991, Cl. 339-99.00R.
Evans, Theodore A.; and Watts, William A., to Goodyear Tire & Rubber Company, The. Packaged articles. 4,110,500, Cl. 428-35.000.
Evans, Wayne Wheeler, to RCA Corporation. Lockup inhibiting arrangement for a phase locked loop tuning system. 4,110,693, Cl. 325-419.000.
Everbrite Electric Signs, Inc.: *See*—
Trame, Charles Edward, 4,110,393, Cl. 264-132.000.
Exxon Production Research Company: *See*—
Cooke, Claude E., Jr., 4,109,717, Cl. 166-250.000.
Exxon Research & Engineering Co.: *See*—
Bosniack, David S.; and Korbach, Paul F., 4,110,196, Cl. 208-13.000.
Facit Aktiebolag: *See*—
Ek, Birger Henrik; and Stenudd, Sven Gunnar Valter, 4,109,776, Cl. 400-124.000.
Fagan, Louis E., to Litton Systems, Inc. Brush block assembly. 4,110,651, Cl. 310-239.000.
Fagersta Secoroc AB: *See*—
Svanstrom, Alf Henrik; and Kangas, Karl-Erik, 4,109,974, Cl. 308-8.200.
Fahey, William David, to Singer Company, The. Character recognition apparatus for serially comparing an unknown character with a plurality of reference characters. 4,110,737, Cl. 340-146.30Q.
Fahrni, Fritz; and Zimmermann, Anton, to Ciba-Geigy AG. Coating device. 4,109,611, Cl. 118-325.000.
Fairchild, Louis F.; and Brecht, Robert R., to Iowa Manufacturing

Comapny. Steering and width controls for expandable tandem rollers. 4,109,742, Cl. 180-20.000.

Falarde, Anna. Self-sealing paste dispensing device. 4,109,836, Cl. 222-494.000.

Faltex Handels AG: *See*—
Barrer, Robert, 4,109,902, Cl. 270-79.000.

Famir International S.p.A.: *See*—
Giaccherino, Renzo Rossetto, 4,109,420, Cl. 51-105.00R.

Farag, Essam A.: *See*—
Kwok, Clyde C. K.; and Farag, Essam A., 4,109,834, Cl. 222-448.000.

Farbu, Leif: *See*—
Gaudernack, Bjorn; Gjelsvik, Norvald; and Farbu, Leif, 4,110,399, Cl. 423-112.000.

Farina, Attilio, to Indesit Industria Elettrodomestici Italiana S.p.A. Circuit for generating a saw tooth waveform. 4,110,666, Cl. 315-408.000.

Farish, Owen, to Westinghouse Electric Corp. Gas-type circuit-interrupters having admixtures of helium with small concentrations of sulfur-hexafluoride ($SF_6$) gas. 4,110,580, Cl. 200-148.00G.

Farley, Ronald William; and Smith, Donald Luke, to Eastman Kodak Company. Discharger apparatus for photoconductors. 4,110,026, Cl. 355-3.00R.

Farmer, Thomas Henry, to Carless, Capel & Leonard Limited. Process for removing polonium from natural gas condensates containing the same. 4,110,204, Cl. 208-251.00R.

Fassel, Velmer A.: *See*—
Olson, Kenneth W.; Haas, William J., Jr.; and Fassel, Velmer A., 4,109,863, Cl. 239-102.000.

Fattori, Joseph E.: *See*—
Fattori, Lazzaro A.; and Fattori, Joseph E., 4,109,789, Cl. 206-404.000.

Fattori, Lazzaro A.; and Fattori, Joseph E., to Plastic Reel Corporation of America. Self-contained latch constructions for interlocking containers in stacked relation. 4,109,789, Cl. 206-404.000.

Faulstich, George W., to Three Sisters Ranch Enterprise. Plastic cap for bottle. 4,109,816, Cl. 215-256.000.

Faygo Beverages, Inc.: *See*—
Roman, Ronald S., 4,109,956, Cl. 296-78.00R.

Feasel, James E., to Airomat Corporation, The. Floor mat having interchangeable design elements. 4,109,439, Cl. 52-667.000.

Fedders Corporation: *See*—
Daily, Thomas Edward, 4,109,397, Cl. 34-239.000.

Fedro, John J.: *See*—
Godfrey, Frederick D., Jr.; Fedro, John J.; and Sinclair, Robert I., 4,109,665, Cl. 131-15.00C.

Fehrer, Ernst; and Konig, Franz, to Dr. Ernst Fehrer Gesellschaft m.b.H. & Co. K.G. Textilmaschinenfabrik u. Stahlbau. Apparatus for twisting textile fibers. 4,109,454, Cl. 57-58.950.

Felcman, Francis Adolph: *See*—
Wood, James Carlos; and Felcman, Francis Adolph, 4,110,050, Cl. 400-248.000.

Feleus, Christiaan Cornelis. Dynamic power booster. 4,109,539, Cl. 74-36.000.

Fennessy, Donald W.; and Schmitz, Harry W., to General Electric Company. Method for manufacturing semiconductor devices. 4,109,373, Cl. 29-588.000.

Fenouillet, Jean Marc Pierre: *See*—
Chevallier, Francois Edmond; and Fenouillet, Jean Marc Pierre, 4,110,097, Cl. 65-136.000.

Ferguson, Hugo S. Mower of the cross-flow blower type with blades of opposite helix angle. 4,109,447, Cl. 56-13.300.

Fernandez, Robert R. Method and apparatus for repairing leaks in water heaters. 4,109,684, Cl. 138-97.000.

Ferralli, Michael W., to Lord Corporation. Muffler. 4,109,752, Cl. 181-252.000.

Ferreira, Sergio Henrique: *See*—
Wilkinson, Samuel; Flower, Roderick John; and Ferreira, Sergio Henrique, 4,110,432, Cl. 424-85.000.

Ferro Corporation: *See*—
Rion, Richard G., 4,110,487, Cl. 427-27.000.

Festa, Thomas A. Schottky diode with voltage limiting guard band. 4,110,775, Cl. 357-15.000.

Feuer, Laszlo; Furka, Arpad; Sebestyen, Ferenc; Hercsel nee Szepespataky, Jolan; and Bendefy nee Dobay, Erzsebet, to Chinoin Gyogyszer es Vegyeszeti Termekek Gyara Rt. Gamma-L-glutamyl cholamine phosphate. 4,110,441, Cl. 424-211.000.

Ffooks, Roger Cambridge; and Komada, Hiroshi, to Conch LNG. Insulation system for liquefied gas tanks. 4,109,823, Cl. 220-446.000.

FIAT Societa per Azioni: *See*—
Bassoli, Cesare; and Cornetti, Giorgio, 4,109,506, Cl. 73-10.000.
Brusaglino, Giampiero; and Savonuzzi, Giovanni, 4,109,743, Cl. 180-65.00C.

Files, James H.; Montague, John M.; and Thomerson, Clarence T., to Regal Tool & Rubber Co., Inc. Bumper assembly shock cell system. 4,109,474, Cl. 61-48.000.

Findlay, Allen Cameron, to Reeves Brothers, Inc. Method and apparatus for forming convolute foam package. 4,109,443, Cl. 53-118.000.

Finley, Joseph H.; Blumbergs, John H.; and Erickson, Clifford A., to FMC Corporation. Mixed carboxylic/sulfonic anhydrides in peroxygen bleaching. 4,110,074, Cl. 8-111.000.

Finnemore, Fred M., to Polaroid Corporation. Pull strip guide for multipurpose film cassettes. 4,110,018, Cl. 352-130.000.

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Moeller, Carl A., Jr., 4,110,054, Cl. 403-373.000.

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Wetherell, Joseph J.; Fogarty, A. Edward; and Fogarty, Bonnie Rose, 4,109,411, Cl. 46-79.000.

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Hayden, Robert Leslie James; and Bell, Alan, 4,109,613, Cl. 122-1.00R.

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Fredenberg, James D.: *See—*
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Freeman, Willie B.; Yeckley, Russell N.; Soles, Otto H.; and Telford, James M., to Westinghouse Electric Corp. Circuit breaker. 4,110,578, Cl. 200-148.00F.
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Mori, Shigeru; Ohsawa, Shigeyoshi; Aoki, Hatsuo; and Imanaka, Hiroshi, 4,110,166, Cl. 195-96.000.
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Gaffar, Abdul; and Friedman, Stuart D., to Colgate-Palmolive Company. Antibacterial oral composition. 4,110,429, Cl. 424-54.000.
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Gaidis, James Michael: *See—*
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Anderson, Harold G.; and Guess, Jeuel E., 4,110,067, Cl. 431-346.000.
Banucci, Eugene George; and Olander, Walter Karl, 4,110,312, Cl. 528-215.000.
Barkan, Philip, 4,110,582, Cl. 200-153.0SC.
Bovenkerk, Harold P., 4,109,737, Cl. 175-329.000.
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Kinson, Philip L., 4,110,541, Cl. 568-725.000.
Lee, Minyoung; and Szala, Lawrence E., 4,110,084, Cl. 51-307.000.
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Gerritsen, Jan Willem. Peristaltic pump having particularly reinforced hose. 4,110,061, Cl. 417-477.000.
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Giaccherino, Renzo Rossetto, to Famir International S.p.A. Grinding machine, particularly for rollers of rolling element bearings. 4,109,420, Cl. 51-105.00R.
Gibson, Otto L. Fruit picking apparatus. 4,109,449, Cl. 56-328.00R.
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Giesecke, Henning; Hocker, Jurgen; and Merten, Rudolf, to Bayer Aktiengesellschaft. Polyparabanic acid derivatives. 4,110,318, Cl. 528-73.000.
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Giolma, William Henry; and Andresen, Bernhard Hans, to Texas Instruments Incorporated. Indirect FM modulation scheme using phase locked loop. 4,110,707, Cl. 332-19.000.
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Gleason, Theodore J. Weighted tennis net support post. 4,109,910, Cl. 273-29.0BB.
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Goates, Delbert T. Novelty postcard and method. 4,109,851, Cl. 229-92.800.
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Gooden, Alan L. Method for regulating characteristics of a gas stream. 4,109,652, Cl. 128-212.000.
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Hunter, Edward E., 4,109,609, Cl. 118-50.000.
Kuhar, George A., 4,110,413, Cl. 260-879.000.
Lawrence, John P., 4,110,319, Cl. 526-17.000.
Oliveira, Paul Edward, 4,110,510, Cl. 428-285.000.
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Gottschlich, James A., to NCR Corporation. Supporting cover for an ink roll means. 4,109,790, Cl. 206-446.000.
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Greenlee, Donald Roy; and Burns, Milton Wayne, to Dresser Industries, Inc. Shutdown system for high pressure well. 4,109,714, Cl. 166-53.000.
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Grendahl, Bernard E., to UOP Inc. Load distributing track fitting. 4,109,891, Cl. 248-503.100.
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Grueneberg, Gary L., to Tenneco, Inc. Noise attenuator. 4,109,755, Cl. 181-256.000.
Grunwald, John J.; D'Ottavio, Eugene D.; Rhodenizer, Harold L.; and Lombardo, Michael S., to MacDermid Incorporated. Process of preparing thermoset resin substrates to improve adherence of electrolessly plated metal deposits. 4,110,147, Cl. 156-306.000.
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Guardamino, Inigo Diaz. Device for regulating the pressure to be applied to the trigger on firearms. 4,109,402, Cl. 42-65.000.
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Gupta, Nirmal K., to Ford Motor Company. Method of preparing composite body and secondary battery or cell incorporating such composite body. 4,110,515, Cl. 429-104.000.
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Hajos, Zoltan George; and Parrish, David Richard, to Hoffmann-La Roche Inc. Asymmetric synthesis of organic compounds. 4,110,380, Cl. 260-586.00C.
Hall, Bruce John. Plant care apparatus. 4,109,415, Cl. 47-67.000.

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Hamada, Nobuhiro; Hirasawa, Kotaro; Hatada, Minoru; and Tamura, Hiroshi, to Hitachi, Ltd. Method of storing articles in a warehouse to form an imaginary link of articles. 4,109,808, Cl. 214-152.000.
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Harrison, George C., to Minnesota Mining and Manufacturing Company. Fired clay pillows and structures made therewith. 4,110,499, Cl. 428-35.000.
Harrison, Peter Arthur; Parks, Anthony John; Southgate, Malcolm Dennis; Sleath, William Derek; and Hills, Richard Keith, to W. Vinten Limited. Document recording machines. 4,110,037, Cl. 355-48.000.
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Hawkins, Ronald G.; Tuttle, Paul D.; and Baker, Mark A., to Aluminum Company of America. Spring friction damper. 4,110,553, Cl. 174-42.000.
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Hayden, Robert Leslie James; and Bell, Alan, to Foster Wheeler Energy Corporation. Steam boilers. 4,109,613, Cl. 122-1.00R.
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Woeckener, Willi; Pawelczyk, Werner; and Marquardt, Klaus-Dieter, 4,110,387, Cl. 264-40.500.
Hermes Precisa International S.A.: *See—*
Clavel, Raymond; and Menzi, Ulrich, 4,109,778, Cl. 400-154.200.
Herning, Joel G.; and Shelton, James B., to UOP Inc. Hydrocarbon conversion with gravity-flowing catalyst particles. 4,110,197, Cl. 208-64.000.
Herolzer, Ralph H.: *See—*
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Herr, Charles H., Jr.: *See—*
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Herrera, Frank J.; and Ponce, Rodger G., to Casa Herrera, Inc. Distributing and processing apparatus. 4,109,568, Cl. 99-477.000.
Herrington, Richard A.: *See—*
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Herrmann, Manfred: *See—*
Stoss, Peter; Satzinger, Gerhard; and Herrmann, Manfred, 4,110,448, Cl. 424-247.000.
Hershkowitz, Joseph; and Akst, Irving B., to United States of America, Army. Explosives containing ammonium nitrate and nitrated amines. 4,110,136, Cl. 149-47.000.
Hesler, Kenneth K.: *See—*
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Hesse, Anton: *See—*
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Hessert, James E.; and Johnston, Chester C., Jr., to Phillips Petroleum Company. Aqueous gelable compositions having extended gelation time and methods of preparing same. 4,110,230, Cl. 252-855.00R.
Hetz, Walter; and Soldner, Richard. Ultrasonic apparatus for medical diagnosis. 4,110,723, Cl. 340-1.00R.
Hewlett-Packard Company: *See—*
Bond, Albert K.; Merrick, Edwin B.; and Nielsen, Larry Lee, 4,109,643, Cl. 128-2.00L.
Hey, Hansjorg; Schaum, Helmut; and Arpe, Hans-Jurgen, to Hoechst Aktiengesellschaft. Process for the purification of carboxylic acids. 4,110,372, Cl. 260-540.000.
Heyning, Bjorn; and Tremblay, Dennis D., to Heath Company. Programmable electronic door chime. 4,110,750, Cl. 340-384.00E.
Hickam, William M., to Westinghouse Electric Corp. Magnetic tape type sensors, method and apparatus using such magnetic tape sensors. 4,110,613, Cl. 250-282.000.
Hicks, Marvin C.: *See—*
Peterson, Glenn R.; Hicks, Marvin C.; and Schwartz, Peter W., 4,110,194, Cl. 208-11.0LE.
Hida, Hiroyuki, to Mitsubishi Pencil Co. Ltd. Construction type educational and amusement device. 4,109,398, Cl. 35-13.000.
Hidaka Engineering Co., Ltd.: *See—*
Kozima, Toyoo, 4,109,501, Cl. 72-327.000.
Higgerson, Raymond; and Parsons, David, to Automotive Products Limited. Release bearing assemblies for vehicle clutches. 4,109,773, Cl. 192-111.00A.
Higgins, Thomas Engel, to Union Carbide Corporation. Method of preparing collagen structures. 4,110,479, Cl. 426-277.000.
Higuchi, Kenji: *See—*
Furukawa, Hikaru; Mitamura, Masakazu; and Higuchi, Kenji, 4,110,746, Cl. 340-347.0NT.
Hilberath, Friedrich; and Teggers, Johannes, to Rheinische Braunkohlenwerke AG. Method of conveying heat energy. 4,109,701, Cl. 165-1.000.
Hildebrand, Cleve R.: *See—*
Balcom, Orville R.; Hildebrand, Cleve R.; and Pollard, Edward L., 4,109,389, Cl. 33-363.00K.
Hildebrand, David C.: *See—*
Halsey, Homer P.; Reed, Lowell E.; and Hildebrand, David C., 4,110,824, Cl. 364-472.000.
Hildebrand, Richard Emil; Paraskos, John Angelo; and Taylor, Herman, Jr., to Gulf Research & Development Company. Process for liquefying coal employing a vented dissolver. 4,110,192, Cl. 208-8.000.
Hilfman, Lee, to UOP Inc. Desulfurization process of a hydrocarbon distillate containing mono-olefins and aromatics. 4,110,203, Cl. 208-216.000.
Hilfman, Lee, to UOP Inc. Process for hydrogenating a coke-forming hydrocarbon distillate. 4,110,205, Cl. 208-255.000.
Hill, James S.: *See—*
Robertson, Allen R.; and Hill, James S., 4,110,124, Cl. 136-236.00R.
Hill, Richard Newton, to W. R. Grace & Co. Production of stabilized wet process phosphoric acid. 4,110,422, Cl. 423-317.000.
Hillman, Gary; and Devico, Michael, to Machine Technology, Inc. Automated two-sided cleaning apparatus. 4,109,337, Cl. 15-21.00D.
Hillmann, Hans. Machine with processing heads. 4,109,360, Cl. 29-26.00A.
Hills, Joseph F., to Jimmy's Radio & Television Corporation. Test unit for stereophonic speaker systems. 4,110,571, Cl. 179-175.10A.
Hills, Richard Keith: *See—*
Harrison, Peter Arthur; Parks, Anthony John; Southgate, Malcolm Dennis; Sleath, William Derek; and Hills, Richard Keith, 4,110,037, Cl. 355-48.000.
Hilti Aktiengesellschaft: *See—*
Vollmer, Helmut; Udert, Karl Ernst; and Oechsle, Hans, 4,109,556, Cl. 85-84.000.
Hiltmann, Rudolf; Heise, Arend; Kazda, Stanislav; and Hoffmeister, Friedrich, to Bayer Aktiengesellschaft. Derivatives of 1-(disubstituted phenoxy)-3-amino-2-hydroxypropanes. 4,110,472, Cl. 424-330.000.
Hilton, Richard D. Ganged heliostat. 4,110,010, Cl. 350-292.000.
Hinkle, Charles G.: *See—*
Culpepper, William F.; and Hinkle, Charles G., 4,109,831, Cl. 222-254.000.
Hirabayashi, Shigeyoshi: *See—*
Usui, Kiyofumi; Hirabayashi, Shigeyoshi; and Hosogaya, Hiroshi, 4,109,843, Cl. 226-109.000.
Hirano, Osamu: *See—*
Koshiga, Fusao; Tanaka, Jinkichi; Watanabe, Itaru; Suzuki, Motoaki; Kojima, Toshifumi; Matsubara, Hiroyoshi; Osuka, Tatsumi; Takeshige, Kenji; Nagamine, Takashi; and Hirano, Osamu, 4,110,589, Cl. 219-66.000.
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Hirose, Fuminori; and Shimizu, Teruo, to Matsushita Electric Industrial Co., Ltd. Component container. 4,109,788, Cl. 206-329.000.
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Okamoto, Jiro; Hirose, Mamoru; Miyamoto, Katsuji; and Kuroki, Shinichiro, 4,110,596, Cl. 219-124.400.
Hisada, Yoshio: *See—*
Takayama, Chiyozo; Yamamoto, Shigeo; Kato, Toshiro; Hisada, Yoshio; and Fujinami, Akira, 4,110,462, Cl. 424-273.00R.
Hisano, Hiroshi; and Sato, Kyoichi, to Tokyo Shibaura Electric Co., Ltd. Semiconductor device having a semiconductor accommodated in a sealed vessel. 4,110,821, Cl. 363-141.000.
Hiszpanski, Jan A.: *See—*
Larsen, Gregory J.; and Hiszpanski, Jan A., 4,109,341, Cl. 15-340.000.
Hitachi, Ltd.: *See—*
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Honda, Haruo; and Itoh, Hiroshi, 4,109,894, Cl. 251-30.000.
Konishi, Nobutake; Yokota, Takeshi; Sugawara, Yoshitaka; Yatsuo, Tsutomu; and Okamura, Masahiro, 4,110,781, Cl. 357-39.000.
Matsuoka, Noboru; and Sugiyama, Kengo, 4,109,387, Cl. 33-185.00V.
Onodera, Hisakichi; Suwa, Masateru; Onuki, Jin; and Shimizu, Yoshiteru, 4,110,783, Cl. 357-67.000.
Watatani, Yoshizumi, 4,110,761, Cl. 358-4.000.
Hjortshoj, Kirsten; and Aunstrup, Knud, to Novo Industri A/S. Beta-glucanase. 4,110,163, Cl. 195-62.000.
Ho, Bin-Lun; and Lee, Geoffrey M., to Memorex Corporation. Crash stop for disc drive actuator. 4,110,802, Cl. 360-106.000.
Hobler, Ross L.: *See—*
Powers, Whitney S., Jr.; Hobler, Ross L.; Bryant, Nelson H.; and Allen, Wilbur J., 4,109,511, Cl. 73-37.600.
Hobson, Charles F., Jr.; and Hamilton, John D., to General Electric Company. Ground fault protection system for multiple source distribution networks. 4,110,808, Cl. 361-44.000.
Hoch, Walter: *See—*
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Hockenberger, Lothar: *See*—
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Hodgdon, Russell B., to Ionics Inc. Ion exchange membranes based upon polyphenylene sulfide. 4,110,265, Cl. 521-30.000.
Hodgson, Allan S.; and Red, Jerry F. P., to SCM Corporation. Recovery of domestic oil from spent clay. 4,110,356, Cl. 260-412.500.
Hodogaya Chemical Co., Ltd.: *See*—
Kurahashi, Takeo; Maeda, Shigeo; Seki, Sanai; Suzuki, Nobuo; and Sakai, Takayuki, 4,110,070, Cl. 8-2.50R.
Hoechst Aktiengesellschaft: *See*—
Bildstein, Siegfried; Lademann, Rudolf; Pietzsch, Siegfried; and Schaeffer, Georg, 4,110,365, Cl. 260-505.00C.
Frischkorn, Hans; and Rosch, Gunter, 4,110,246, Cl. 252-301.280.
Hey, Hansjorg; Schaum, Helmut; and Arpe, Hans-Jurgen, 4,110,372, Cl. 260-540.000.
Mayer, Norbert; Pfahler, Gerhard; and Wiezer, Hartmut, 4,110,334, Cl. 260-293.660.
Mildenberger, Hilmar; Stahler, Gerhard; and Emmel, Ludwig, 4,110,336, Cl. 260-307.00G.
Papenfuhs, Theodor; and Volk, Heinrich, 4,110,375, Cl. 260-559.00R.
Roder, Edgar; Merk, Fritz; and Rohrig, Luto, 4,110,039, Cl. 355-68.000.
Schindler, Hermann; and Zimmermann, Wolfgang, 4,110,494, Cl. 427-385.00R.
Hoehn, Hans: *See*—
Denzel, Theodor; and Hoehn, Hans, 4,110,454, Cl. 424-251.000.
Hoel, Steven Michael, to Snyder Manufacturing Co., Ltd. Striped laminate and method and apparatus for making same. 4,110,497, Cl. 428-190.000.
Hoesch Werke Aktiengesellschaft: *See*—
Hagen, Albert; Kaiser, Theodor; and Pohler, Heinz, 4,109,361, Cl. 29-148.40C.
Hofer, Donald C.; Kahwaty, Vincent N.; and Valentino, Carl R., to International Business Machines Corporation. NMR field frequency lock system. 4,110,681, Cl. 324-0.50A.
Hoffmann-La Roche Inc.: *See*—
Chan, Ka-Kong; and Saucy, Gabriel, 4,110,346, Cl. 260-345.500.
Hajos, Zoltan George; and Parrish, David Richard, 4,110,380, Cl. 260-586.00C.
Klein, Bernard; and Foreman, James Arthur, 4,110,077, Cl. 23-230.00B.
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Hoheisel, Peter-Matthias; and Komander, Gerhard, to Daimler-Benz Aktiengesellschaft. Ignition device for passive retention system. 4,110,813, Cl. 361-248.000.
Hohl, Frank: *See*—
United States of America, National Aeronautics and Space Administration; Jalufka, Nelson W.; Hohl, Frank; DeYoung, Russell J.; and Williams, Michael D., 4,110,703, Cl. 331-94.50P.
Hohnecker, Lynn: *See*—
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Hollins, Brian E.: *See*—
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Holmes, Richard E., to Eli Lilly and Company. 7-Amino and 7-alkanoylamino 2-oxo-3-phenylindolines. 4,110,465, Cl. 424-274.000.
Holmstrem, Andrew B.: *See*—
Isgur, Irving E.; Holmstrem, Andrew B.; and Hayes, Norman J., 4,110,508, Cl. 428-240.000.
Holt, Brian; and Randell, Donald Richard, to Ciba-Geigy Corporation. Polymers stabilized by esters of piperidinols. 4,110,305, Cl. 260-45.80N.
Holt, Margaret. Bath tub enclosure. 4,109,326, Cl. 4-173.00R.
Holtz, Hans D.: *See*—
Smith, Clifford E.; and Holtz, Hans D., 4,110,252, Cl. 252-442.000.
Holz, George E. Indirect induction apparatus for heating fluids. 4,110,588, Cl. 219-10.49R.
Honda Giken Kogyo Kabushiki Kaisha: *See*—
Itakura, Kiyoyuki; Ishii, Yohji; Ohata, Satoru; and Watanabe, Masao, 4,109,463, Cl. 60-282.000.
Honda, Haruo; and Itoh, Hiroshi, to Hitachi, Ltd. Pilot valve device for regulating the flow of a fluid. 4,109,894, Cl. 251-30.000.
Honda, Ichiro; Takasu, Shigetoshi; and Onuki, Yoshio, to Suzuki Metal Industrial Co, Ltd. Heat pipes, process and apparatus for manufacturing same. 4,109,709, Cl. 165-105.000.
Honeywell Inc.: *See*—
Chaffin, John H., III; and Skogman, Richard A., 4,110,489, Cl. 427-164.000.
Payne, Robert L., 4,110,641, Cl. 307-355.000.
Shavit, Gideon, 4,110,827, Cl. 364-550.000.
Spethmann, Donald H., 4,109,704, Cl. 165-16.000.
Honeywell Information Systems, Inc.: *See*—
Porter, Marion G.; and Patterson, Garvin Wesley, 4,110,822, Cl. 364-200.000.
Wilson, Edward A.; and Fredenberg, James D., 4,109,707, Cl. 165-46.000.
Hongu, Masayuki; Tokuhara, Masaharu; and Kawakami, Hiromi, to Sony Corporation. Amplifying circuit. 4,110,635, Cl. 307-233.00R.
Honjo, Yoshihiko; and Kuroda, Junji, to Victor Company of Japan, Ltd. System for detecting height fluctuations of a surface on a recording medium in an optical recording or reproducing apparatus. 4,110,607, Cl. 250-201.000.
Hooker Chemicals & Plastics Corp.: *See*—
Day, F. Howard, 4,110,373, Cl. 260-543.00R.
Hoover, Raul M.; Lussiez, Guy W.; and Reid, Hugh F., to Amax Inc. Solid-liquid separation of laterite slurries. 4,110,401, Cl. 423-150.000.
Hopp, Rudolf; Sturm, Wolfgang; and Steinfatt, Fritz, to Haarmann & Reimer GmbH. A method of deodorizing. 4,110,430, Cl. 424-65.000.
Horikawa, Shigeo. Sound producing device. 4,109,608, Cl. 116-137.00R.
Horn, Berthold K. P., to Butler-Newton, Inc. Tomography X-ray detector. 4,110,621, Cl. 250-361.00R.
Hornagold, John T.; Beckley, Gary H.; and Rathi, Ram N., to American Hoist & Derrick Company. Steering mechanism. 4,109,747, Cl. 180-140.000.
Horowitz, Charles; and Lissau, Frederic, to Sloan Valve Company. Combination gladhand and shutoff cock. 4,109,673, Cl. 137-381.000.
Horrom, Bruce Wayne, to Abbott Laboratories. N-vinyloxyethyl-α-methyl-β-phenethylamines as alcohol intake suppressing agents. 4,110,471, Cl. 424-330.000.
Horton, Robert A.: *See*—
Miller, Robert R.; and Horton, Robert A., 4,109,699, Cl. 164-244.000.
Hoshino, Yasushi; and Namikawa, Mamoru, to Tokyo Jiki InsatsuKabushiki Kaisha; and Hoshino, Yasushi. Magnetic recording reproducing apparatus with field generating means within the copy medium. 4,110,797, Cl. 360-17.000.
Hosogaya, Hiroshi: *See*—
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Hotto, Robert: *See*—
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Hovey, Richard J., to American Optical Corporation. Photochromic plastic material. 4,110,244, Cl. 252-300.000.
Howard, James A.; and Smith, Roger, Jr., to BJ-Hughes Inc. Multistage well-drilling mast assembly. 4,109,800, Cl. 214-2.500.
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Hoya Corporation: *See*—
Yamashita, Toshiharu, 4,110,245, Cl. 252-300.000.
Hoyt, Charles W., to Wolverine Corporation. Material treatment system. 4,109,394, Cl. 34-57.00B.
Huang, Barney K. Greenhouse, drying, storing nursery system. 4,109,395, Cl. 34-93.000.
Hubbard, James Henry; Hubert, Wallace Lloyd; and Spivey, Paul Richard, to International Business Machines Corporation. Copy production machines having supply sheet pick retry. 4,110,032, Cl. 355-14.000.
Hubbard, William Ernest; Hyde, Robert; and Crawford, Peter Frederick, to Automotive Products Limited. Method of assembling a subassembly of a diaphragm spring friction clutch. 4,109,368, Cl. 29-446.000.
Hubble, Fred F., III; and Tasseff, John B., II, to Xerox Corporation. Support structure for a corona generating device. 4,110,811, Cl. 361-225.000.
Huber, W. Donald, to Sperry Rand Corporation. Phase lock oscillator for use in data processing system. 4,110,557, Cl. 178-69.100.
Hubert, Jacques; Ory, Jean-Marie; Bottin, Jean; and Humbert, Claude, to Societe Chimique des Charbonnages. Device for monitoring physical activity of persons. 4,110,741, Cl. 340-573.000.
Hubert, Wallace Lloyd: *See*—
Hubbard, James Henry; Hubert, Wallace Lloyd; and Spivey, Paul Richard, 4,110,032, Cl. 355-14.000.
Huckins, James N.: *See*—
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Elliott, Charles Anthony; and Huff, Larry Dean, 4,109,919, Cl. 274-9.00B.
Hugenbruch, Ernst. Drum-type machine for the treatment of textile material. 4,109,493, Cl. 68-27.000.
Huggler, Peter E.: *See*—
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Hughes Aircraft Company: *See*—
Otto, Oberdan W., 4,110,714, Cl. 333-72.000.
Pastor, Antonio C., 4,110,080, Cl. 23-273.0SP.
Hughes, Donald Wayne Kent; and Porta, Gary Douglas, to AMP Incorporated. Connector for compressor header. 4,109,992, Cl. 339-147.00R.
Hughes, James L.; and Broerman, William E., to Industrial Value Analysis Inc. Sanitary yard hydrant. 4,109,671, Cl. 137-282.000.
Hughes, Joe L. Needle holding device with pick-up means. 4,109,658, Cl. 128-340.000.
Hughes, Lawrence J.: *See*—
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Hughes, Nathaniel. Sonic energy transducer. 4,109,862, Cl. 239-102.000.
Hull, Ezekiel H.; and McIntosh, Robert H., to Askew, Anthony B. Self-sanitizing carpet construction composition. 4,110,504, Cl. 428-97.000.
Humbert, Claude: *See—*
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Hund, Helmut: *See—*
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Hunter, Edward E., to Goodyear Tire & Rubber Company, The. Vacuum-pressurized immersion coater. 4,109,609, Cl. 118-50.000.
Hunter, Willard L.: *See—*
Paulson, Danton L.; and Hunter, Willard L., 4,110,107, Cl. 75-24.000.
Hunzicker, Dean L., to Air Master Systems, Inc. Adapter manifold for ventilation hood. 4,109,641, Cl. 126-299.00D.
Hurni, William M.: *See—*
McAleer, William J.; and Hurni, William M., 4,110,223, Cl. 210-388.000.
Hurtado T, Jorge E.; and Arrieta, Diogenes A. Tractor spray cylinder attachment. 4,109,865, Cl. 239-147.000.
Husted, Royce Hill, to Saroy Engineering. Power driven ski-bob. 4,109,739, Cl. 180-5.00R.
Hveem, Carl J. Manually operated throttle control for four wheel drive vehicle. 4,109,745, Cl. 180-77.00H.
Hyde, Robert: *See—*
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Ichihashi, Hiroo: *See—*
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Ichikawa, Yataro; Kobayashi, Osamu; Soma, Kazuhiko; Naruchi, Tatuyuki; Yamanaka, Yoshiyuki; and Suzuki, Nobuo, to Teijin Limited. Process for preparing $\beta,\gamma$-unsaturated aldehydes. 4,110,403, Cl. 260-603.00R.
Ichimura, Masahiko: *See—*
Abe, Takeshi; Ichimura, Masahiko; Noshiro, Makoto; Kunii, Nobuaki; and Ito, Yasumichi, 4,110,308, Cl. 260-45.75C.
Ideal Toy Corporation: *See—*
Nielsen, Edwin A., 4,109,913, Cl. 273-86.00B.
Ikeda, Hisatoshi: *See—*
Murano, Minoru; Yanabu, Satoru; Tamagawa, Tohoru; and Ikeda, Hisatoshi, 4,110,806, Cl. 361-4.000.
Ikeda, Toshiki; and Beppu, Yoshitsugu, to Sekisui Kaseihin Kogyo Kabushiki Kaisha. Expandable ethylenically unsaturated polymer particle compositions. 4,110,267, Cl. 521-59.000.
Ikeda, Yoshitsugi, to Olympus Optical Co., Ltd. Large aperture photographic lens system. 4,110,007, Cl. 350-215.000.
Ikegami, Iwao: *See—*
Mashida, Toru; Matsushita, Sumeo; and Ikegami, Iwao, 4,110,139, Cl. 156-79.000.
Ikemori, Keiji, to Canon Kabushiki Kaisha. Telephoto type zoom lens. 4,110,006, Cl. 350-186.000.
Ikezawa, Harumi: *See—*
Umemura, Sumio; Ohdan, Kyoji; Sakai, Fumihiko; Bando, Yasuo; and Ikezawa, Harumi, 4,110,350, Cl. 260-346.750.
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Illinois Tool Works Inc.: *See—*
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Imanaka, Hiroshi; Kijima, Yoshihiko; Sugitawa, Chikara; and Sumoto, Misao, to Toyo Boseki Kabushiki Kaisha. Polyester copolymer compositions. 4,110,411, Cl. 260-873.000.
Imanaka, Hiroshi: *See—*
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Imoberdorf & Co.: *See—*
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Imperial Chemical Industries Limited: *See—*
Dart, Edward Charles; Cantwell, John Burnett; Traynor, James Rodney; Jaworzyn, Joseph Franciszek; and Nemcek, Jozef, 4,110,184, Cl. 204-159.230.
Thomas, David Hamilton, 4,109,514, Cl. 73-58.000.
Wooler, Alan Metcalf, 4,110,397, Cl. 264-338.000.
Imral, Sadik S., to Intertherm, Inc. Air conditioner unit having compartment provisions for access and motor cooling. 4,109,708, Cl. 165-48.00R.
Inaba, Shigeho: *See—*
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Industrial Value Analysis Inc.: *See—*
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Ingalls, Robert A., to Joy Manufacturing Company. Method of making screw rotor machine rotors. 4,109,362, Cl. 29-156.40R.
Inland Steel Company: *See—*
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Inoue, Satoru; Uematsu, Tamon; and Yamashita, Norihisa, to Sumitomo Chemical Company, Limited. Oxyindole compound. 4,110,466, Cl. 424-274.000.
Inoue, Shigeru, to Mitsui Toatsu Chemicals Inc. Process for separating and recovering unreacted materials in urea synthesis. 4,110,374, Cl. 260-555.00A.
Inoue, Takehisa; Ogawa, Yutaka; Sugita, Hiroaki; and Watanabe, Namio, to Akebono Brake Industry Co., Ltd. Disc brake. 4,109,766, Cl. 188-73.400.
Institut Pasteur: *See—*
Chacornac, Georges, 4,109,655, Cl. 128-253.000.
Institut Textile de France: *See—*
Ducol, Jean-Paul; Gobry, Dominique; Raisin, Jean-Pierre; and Agence Nationale de Valorisation de la Recherche (ANVAR), 4,109,595, Cl. 112-121.110.
Institute of Applied Physiology & Medicine: *See—*
Reid, John M.; and Spencer, Merrill P., 4,109,642, Cl. 128-2.00V.
Institutt for Atomenergi: *See—*
Gaudernack, Bjorn; Gjelsvik, Norvald; and Farbu, Leif, 4,110,399, Cl. 423-112.000.
Intermountain Oil Research, Inc.: *See—*
Peterson, Glenn R.; Hicks, Marvin C.; and Schwartz, Peter W., 4,110,194, Cl. 208-11.0LE.
International Business Machines Corporation: *See—*
Bergeron, David Leo; Putney, Zimri Congdon; and Stephens, Geoffrey Brownell, 4,110,126, Cl. 148-1.500.
Beyer, Klaus Dietrich, 4,110,125, Cl. 148-1.500.
Blaser, Eugene Martin; and Conrad, Donald Adelbert, 4,110,633, Cl. 307-205.000.
Blazick, Linda Ann; and Miller, Lewis Franklin, 4,109,377, Cl. 29-626.000.
Brown, Leon Calvin; Edwards, Earl Garland; Peterson, Charles Edwin; Robinson, Peter George; and Wilson, Clement Card, 4,110,068, Cl. 432-60.000.
Cairns, James Anthony; Lurio, Allen; and Ziegler, James Francis, 4,110,625, Cl. 250-492.00A.
Castrodale, Daniel Owen; Lovgren, Jeffrey Lynn; Russell, Ralph Arthur; and Shidler, Karl Allen, 4,110,804, Cl. 360-118.000.
Chen, Tien Chi, 4,110,837, Cl. 364-900.000.
Crouse, William George, 4,110,705, Cl. 332-11.00D.
Dubil, James F.; Leighton, Howard N.; and Wilfinger, Raymond J., 4,110,835, Cl. 364-844.000.
Geffken, Robert Michael, 4,109,372, Cl. 29-571.000.
Hofer, Donald C.; Kahwaty, Vincent N.; and Valentino, Carl R., 4,110,681, Cl. 324-0.50A.
Hubbard, James Henry; Hubert, Wallace Lloyd; and Spivey, Paul Richard, 4,110,032, Cl. 355-14.000.
Krygowski, Matthew A., 4,110,830, Cl. 364-200.000.
Langdon, Glen George, Jr., 4,110,831, Cl. 364-745.000.
Leininger, Joel Calvin; and Taylor, George Phillips, 4,110,832, Cl. 364-786.000.
May, Gordon Herbert, 4,110,594, Cl. 219-121.0LM.
Schindler, Hans Rudolf; and Vettiger, Peter, 4,110,569, Cl. 179-84.00A.
International Computers Limited: *See—*
Davies, Dennis, 4,109,378, Cl. 29-629.000.
International Lead Zinc Research Organization, Inc.: *See—*
Dreulle, Paule; Longuepee, Michel; and Dhaussy, Dominique, 4,110,128, Cl. 148-6.15Z.
Longuepee, Michel; and Dreulle, Noel, 4,110,127, Cl. 148-6.15Z.
International Paper Company: *See—*
Stifano, Joseph Michael, 4,109,820, Cl. 220-240.000.
International Standard Electric Corporation: *See—*
Boucher, Donald Joseph, 4,110,567, Cl. 179-84.0VF.
Foster, Basil Bernard, 4,110,570, Cl. 179-170.00J.
Heine, Bernhard; Arndt, Wolfgang; and Lower, Hartmut, 4,110,555, Cl. 178-3.000.
International Telephone and Telegraph Corporation: *See—*
Acar, Ali, 4,109,675, Cl. 137-494.000.
Chown, Martin, 4,109,994, Cl. 350-96.210.
Kaszerman, Philip, 4,110,756, Cl. 343-7.300.
Konigsford, Barry S.; Davidson, Kenneth; and Marschak, Howard J., 4,109,795, Cl. 211-57.100.
Lawford, Victor N.; and Sacarisen, David F., 4,109,531, Cl. 73-438.000.
Lombardi, Anthony Joseph, 4,110,552, Cl. 174-35.0MS.
Intertherm, Inc.: *See—*
Imral, Sadik S., 4,109,708, Cl. 165-48.00R.
Ioffe, Benyamin Alexandrovich; and Kalnin, Robert Karlovich. Method of dismantling units. 4,109,366, Cl. 29-427.000.
Ionics Inc.: *See—*
Hodgdon, Russell B., 4,110,265, Cl. 521-30.000.
Iowa Manufacturing Comapny: *See—*
Fairchild, Louis F.; and Brecht, Robert R., 4,109,742, Cl. 180-20.000.
Ipfelkofer, Armin: *See—*
Bauer, Karl A.; Baur, Peter F.; Biedermann, Horst H.; Made', Andreas; Nitsch, Friedrich; Pechinger, Ernst; Koenig, Walter; Ipfelkofer, Armin; Rindsfuesser, Johann J.; and Weber, Helmut, 4,109,779, Cl. 400-584.000.
Irvine, Robert; Luperti, Harry E.; and Manna, Robert E., to Pitney-Bowes, Inc. Document feeder for a copier. 4,110,038, Cl. 355-50.000.
Irwin, James Stuart; and Gilmore, Merle Lee, to Motorola Inc. Astable multivibrator with temperature compensation and requiring a single supply voltage. 4,110,704, Cl. 331-113.00R.
Isgur, Irving E.; Holmstrem, Andrew B.; and Hayes, Norman J., to W. R. Grace & Co. Foam sheet and method. 4,110,508, Cl. 428-240.000.
Isherwood, Jeffrey, to Crosfield Electronics Limited. Detecting lateral position of webs. 4,110,627, Cl. 250-561.000.

Ishii, Kazuo, to Tokyo Shibaura Electric Co., Ltd. Loud-speaker output circuit. 4,110,559, Cl. 179-1.00D.

Ishii, Yohji: *See—*
Itakura, Kiyoyuki; Ishii, Yohji; Ohata, Satoru; and Watanabe, Masao, 4,109,463, Cl. 60-282.000.

Ishikawa, Masao, to Nissan Motor Company, Ltd. Headlight tilting control device of motor vehicle. 4,110,819, Cl. 362-40.000.

Isuzu Motors Limited: *See—*
Kawamura, Hideo; and Kubota, Kimi, 4,109,625, Cl. 123-119.00A.

Itakura, Kiyoyuki; Ishii, Yohji; Ohata, Satoru; and Watanabe, Masao, to Honda Giken Kogyo Kabushiki Kaisha. Exhaust reaction chamber for internal combustion engine. 4,109,463, Cl. 60-282.000.

Itani, Katsutoshi: *See—*
Matsumoto, Akira; and Itani, Katsutoshi, 4,110,237, Cl. 252-79.400.

Ito, Kazuo, to Kabushiki Kaisha Daini Seikosha. Standard signal generating apparatus. 4,110,640, Cl. 307-303.000.

Ito, Kiyomatsu. Capsule lamp as a fishing tackle. 4,109,405, Cl. 43-17.500.

Ito, Yasumichi: *See—*
Abe, Takeshi; Ichimura, Masahiko; Noshiro, Makoto; Kunii, Nobuaki; and Ito, Yasumichi, 4,110,308, Cl. 260-45.75C.

Itoh, Hiroshi: *See—*
Honda, Haruo; and Itoh, Hiroshi, 4,109,894, Cl. 251-30.000.

Itou, Takaaki: *See—*
Konishi, Masami; Nakamura, Norihiko; Itou, Takaaki; and Kikuchi, Kazuo, 4,110,417, Cl. 261-39.00A.

ITT Industries, Incorporated: *See—*
Schopper, Bernd, 4,109,967, Cl. 303-6.00C.

Ivancevich, Marko. Paint - by - rainbow - ring art kit with prestroked panel. 4,109,399, Cl. 35-26.000.

Iverson, Myren L., to United States of America, Navy. Optical slip-rings. 4,109,997, Cl. 350-23.000.

Iverson, Myren L., to United States of America, Navy. Optical slip-rings. 4,109,998, Cl. 350-23.000.

Iwasaki, Yasuhiro, to Silver Seiko Ltd. Electrical connecting device for a hand-operated knitting machine. 4,109,489, Cl. 66-75.200.

Iyomasa, Arthur N. Foot massager. 4,109,649, Cl. 128-57.000.

Izon Corporation: *See—*
Yevick, George J., 4,110,014, Cl. 350-342.000.
Yevick, George J., 4,110,022, Cl. 353-120.000.

J. M. Huber Corporation: *See—*
Kunkle, Albert C.; Abercrombie, William Floyd, Jr.; and Akins, Charles John, Jr., 4,110,189, Cl. 204-180.00R.

J. P. Stevens & Co., Inc.: *See—*
Mazzone, Charles P., 4,109,356, Cl. 28-279.000.

J. Uriach & Cia S.A.: *See—*
Barra, Emilia Francia; and Moga, Antonio Carmelo Marin, 4,110,442, Cl. 424-212.000.

Jabsen, Felix Stanley, to Babcock & Wilcox Co., The. Industrial technique. 4,110,157, Cl. 176-36.00C.

Jacobs, David R.: *See—*
Spanel, Abram N.; Eiland, P. Frank; Jacobs, David R.; and Ziegler, Geza C., 4,109,594, Cl. 112-79.00R.

Jacobson, Paul D., to Caterpillar Tractor Co. Detent mechanism. 4,109,547, Cl. 74-526.000.

Jakob, Gert: *See—*
Goetzke, Siegfried; and Jakob, Gert, 4,110,549, Cl. 174-16.0HS.

Jakovlev, Vladimir: *See—*
von Bebenburg, Walter; Schulmeyer, Norbert; and Jakovlev, Vladimir, 4,110,455, Cl. 424-256.000.

Jalufka, Nelson W.: *See—*
United States of America, National Aeronautics and Space Administration; Jalufka, Nelson W.; Hohl, Frank; DeYoung, Russell J.; and Williams, Michael D., 4,110,703, Cl. 331-94.50P.

Jameson, Neal E., to FMC Corporation. Attitude maintaining mechanism for a marine loading arm. 4,109,688, Cl. 141-387.000.

Janko, Bozidar; and Silzars, Aris, to Tektronix, Inc. Touch display to digital encoding system. 4,110,749, Cl. 340-365.00C.

Janoulis, Alexandros James: *See—*
Wagnon, Albert Lloyd; and Janoulis, Alexandros James, 4,110,216, Cl. 210-156.000.

Jansen, Bernard George, Jr., to Narad, Inc. Load spacer support. 4,109,587, Cl. 105-490.000.

Janssen Pharmaceutica N.V.: *See—*
Vandenberk, Jan; Kennis, Ludo E. J.; Van der Aa, Marcel J. M. C.; and Van Heertum, Albert H. M. Th., 4,110,333, Cl. 260-293.570.

Japan Airlines Co., Limited: *See—*
Mihirogi, Kiyoshi, 4,109,584, Cl. 104-130.000.

Japikse, Cornelis H.: *See—*
Liepa, Alexander L.; and Japikse, Cornelis H., 4,110,255, Cl. 252-455.00Z.

Jarman, Trevor Rodney: *See—*
Righelato, Renton Clive; and Jarman, Trevor Rodney, 4,110,162, Cl. 195-31.00P.

Jarocha, William M.; and O'Neil, Walter K., to Eaton Corporation. Tire pressure monitor. 4,110,732, Cl. 340-58.000.

Jarvis, Kenneth W. Rear view mirror system with elliptically curved mirror and flat mirror. 4,110,012, Cl. 350-302.000.

Jaworski, Eugene: *See—*
Breslow, Jeffrey D.; and Jaworski, Eugene, 4,109,916, Cl. 273-121.00A.

Jaworzyn, Joseph Franciszek: *See—*
Dart, Edward Charles; Cantwell, John Burnett; Traynor, James Rodney; Jaworzyn, Joseph Franciszek; and Nemcek, Jozef, 4,110,184, Cl. 204-159.230.

Jayakumar, Nagab: *See—*
Sarkissian, Vahe A.; Jayakumar, Nagab; Kroeger, Joseph H.; and Schlageter, Jeffrey M., 4,110,842, Cl. 365-233.000.

Jeanmart, Claude: *See—*
Barreau, Michel; Cotrel, Claude; and Jeanmart, Claude, 4,110,450, Cl. 424-250.000.

Jensen, Robert H.: *See—*
Millar, Robert F.; Persico, Paul J.; and Jensen, Robert H., 4,110,081, Cl. 23-288.00G.

Jesse, Gerhard. Friction gear. 4,109,541, Cl. 74-194.000.

Jha, Mahesh C.; Wicker, Gordon R.; and Meyer, Gustavo A., to Amax Inc. Selective precipitation of nickel and cobalt sulfides from acidic sulfate solution. 4,110,400, Cl. 423-141.000.

Jimmy's Radio & Television Corporation: *See—*
Hills, Joseph F., 4,110,571, Cl. 179-175.10A.

Job, Eduard J. Dual-seal sprinkler system. 4,109,727, Cl. 169-41.000.

Joel Tall, Inc.: *See—*
Tall, Joel, 4,110,142, Cl. 156-159.000.

Johannes Menschner Textilmaschinenfabrik: *See—*
Buthe, Fritz, 4,109,352, Cl. 26-15.00R.

Johannesen, Donald Dixon, to Bendix Corporation, The. Mechanically actuated disc brake. 4,109,765, Cl. 188-72.700.

Johansson, Anders; and Strombeck, Per, to Salen & Wicander Terminalsystem AB. Device for moving railway waggons. 4,109,806, Cl. 214-38.0CC.

Johansson, Anders H.: *See—*
Leo, Thomas J.; and Johansson, Anders H., 4,110,240, Cl. 252-182.000.

Johansson, Karl Ingmar Wenzel: *See—*
Bjorkqvist, Nils Gunnar; Franzen, Hans Arne Edgar; and Johansson, Karl Ingmar Wenzel, 4,109,577, Cl. 102-35.600.

Johns-Manville Corporation: *See—*
Heitmann, Glenn Alvin; and Trosper, Milton French, Jr., 4,110,513, Cl. 428-528.000.

Johnson Controls, Inc.: *See—*
Laakaniemi, Richard N.; Ploszaj, Leon C.; and Schultz, Bruce R., 4,110,140, Cl. 156-87.000.

Johnson, Delmar R.; Flint, John R.; Wells, Thomas R.; Erikson, Rolf B.; and Rady, Bruce A., to Bell & Howell Company. Electronically controlled microfilm photographic image utilization device. 4,110,020, Cl. 353-26.00A.

Johnson & Johnson Baby Products Company: *See—*
Lindemann, Martin K. O.; Kennedy, Robert R.; and Verdicchio, Robert J., 4,110,263, Cl. 252-545.000.

Johnson, Oliver Wendell, to Eaton Corporation. Controller for fluid pressure operated devices. 4,109,679, Cl. 137-596.130.

Johnson, Oscar F. Animal trap. 4,109,407, Cl. 43-85.000.

Johnson/Rhodes Cultured Foods, Inc.: *See—*
Rhodes, Kenneth H., 4,110,476, Cl. 426-41.000.

Johnson, Roy A.; and Sih, John C., to Upjohn Company, The. 5-Hydroxy-PGI$_1$ compounds. 4,110,532, Cl. 542-426.000.

Johnson, Tore Rudolf: *See—*
Bogar, Jerry Hench; and Johnson, Tore Rudolf, 4,110,000, Cl. 350-96.210.

Johnston, Chester C., Jr.: *See—*
Hessert, James E.; and Johnston, Chester C., Jr., 4,110,230, Cl. 252-855.00R.

Jolin, Andre, to Micarna AG Fleischwarenfabrik. Power operated apparatus for splitting carcasses of slaughtered animals. 4,109,347, Cl. 17-23.000.

Jolles, Pierre; and Migliore-Samour, Daniele, to Agence Nationale de Valorisation de la Recherche (ANVAR). Novel immunological adjuvants, process for their production and compositions containing them. 4,110,434, Cl. 424-92.000.

Jones, Annette: *See—*
Dotson, James D.; and Jones, Annette, 4,110,629, Cl. 290-38.00R.

Jones, Basil B. Water closet flange with continuous bolt slot. 4,109,327, Cl. 4-252.00R.

Jones, Eldon D. Apparatus for mounting and demounting a vehicle body. 4,109,810, Cl. 214-505.000.

Jones, Graham Robin Scott: *See—*
Bennett, John Peter; and Jones, Graham Robin Scott, 4,110,836, Cl. 364-860.000.

Jones, Howard S., Jr.: *See—*
Reggia, Frank; and Jones, Howard S., Jr., 4,110,751, Cl. 343-700.0MS.

Jones Instrument Corporation: *See—*
Broadman, Richard J.; and May, Richard D., 4,109,533, Cl. 73-498.000.

Jones, Raymond. Clamp repair unit. 4,109,694, Cl. 151-69.000.

Jorgensen, Clarence W., deceased; and by Jorgensen, Elva Mae, executrix. Self-energized alarm device. 4,109,606, Cl. 116-94.000.

Jorgensen, Elva Mae, executrix: *See—*
Jorgensen, Clarence W., deceased; and Jorgensen, Elva Mae, executrix, 4,109,606, Cl. 116-94.000.

Jorgensen, Neal A.: *See—*
DeLuca, Hector F.; and Jorgensen, Neal A., 4,110,446, Cl. 424-236.000.

Jos. Schneider & Co. Optische Werke Kreuznach: *See—*
Schutz, Karl-Heinz; and Tesch, Karl, 4,110,769, Cl. 354-195.000.

Joy Manufacturing Company: *See—*
Ingalls, Robert A., 4,109,362, Cl. 29-156.40R.

Julius Blum Gesellschaft m.b.H.: *See—*
Rock, Erich; and Mages, Bernhard, 4,109,344, Cl. 16-144.000.

Junck, John A.; and Lorimor, Larry W., to Caterpillar Tractor Co.

Control valve arrangement with a preconditioned relief valve and a flow force compensated valve spool. 4,109,561, Cl. 91-451.000.
Kabele, Dennis Frederick, to Deere & Company. Noise silencer. 4,109,751, Cl. 181-247.000.
Kabushiki Kaisha Daini Seikosha: *See*—
Hata, Morinaka; and Shinoda, Isao, 4,110,655, Cl. 310-344.000.
Ito, Kazuo, 4,110,640, Cl. 307-303.000.
Suzuki, Keiichi; Takahashi, Keikichi; Matsuura, Eiichi; and Harada, Akinobu, 4,109,458, Cl. 58-63.000.
Kabushiki Kaisha Komatsu Seisakusho: *See*—
Yoshida, Yasuhiko, 4,109,807, Cl. 214-131.00R.
Kabushiki Kaisha Naruse Fermentation Laboratory: *See*—
Naruse, Kintaro; and Naruse, Wataru, 4,110,477, Cl. 426-46.000.
Kabushiki Kaisha Suwa Seikosha: *See*—
Yamada, Kuniharu; and Teraishi, Katsuhiro, 4,109,456, Cl. 58-23.0AC.
Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See*—
Kobayashi, Akira; Chiba, Kunji; Miyamoto, Noriaki; Shiraki, Masao; and Furukawa, Naotake, 4,109,452, Cl. 57-58.890.
Kobayashi, Akira; Chiba, Kunji; Miyamoto, Noriaki; Shiraki, Masao; and Furukawa, Naotake, 4,109,453, Cl. 57-58.910.
Yamada, Yasuo; Kamiya, Kazuo; Katayama, Iwao; Motobayashi, Kozo; and Yonemura, Yoshiaki, 4,109,451, Cl. 57-56.000.
Yoshida, Yoshiaki; Suzuki, Osamu; and Onoue, Keizi, 4,109,450, Cl. 57-34.00R.
Kabushiki Kaisha Toyota Chuo Kenkyusho: *See*—
Fujitani, Yoshiyasu; and Muraki, Hideaki, 4,109,461, Cl. 60-274.000.
Kadkade, Prakash G., to GTE Laboratories Incorporated. Control of plants abscission processes by using specific light sources. 4,109,414, Cl. 47-58.000.
Kaercher, William C., Jr. Device and method for diverting rolls of sod delivered from conventional sod cutting apparatus. 4,109,729, Cl. 172-1.000.
Kageyama, Satoshi; and Sekiya, Kunihiko, to Tokyo Shibaura Electric Co., Ltd. Data transmission system. 4,110,558, Cl. 178-69.100.
Kahwaty, Vincent N.: *See*—
Hofer, Donald C.; Kahwaty, Vincent N.; and Valentino, Carl R., 4,110,681, Cl. 324-0.50A.
Kaiser, Theodor: *See*—
Hagen, Albert; Kaiser, Theodor; and Pohler, Heinz, 4,109,361, Cl. 29-148.40C.
Kakigi, Takao, to Cybernet Electronic Corporation. Channel selecting device. 4,110,690, Cl. 325-25.000.
Kalat, Edwin F., to Risdon Manufacturing Company, The. Powdered solid aerosol composition and method of manufacture. 4,110,427, Cl. 424-46.000.
Kalnin, Robert Karlovich: *See*—
Ioffe, Benyamin Alexandrovich; and Kalnin, Robert Karlovich, 4,109,366, Cl. 29-427.000.
Kaltenbach & Voigt GmbH & Co.: *See*—
Grupelli, Renato, 4,109,958, Cl. 297-191.000.
Kamata, Akira, to Rank Xerox, Ltd. Cleaning system for an electrophotographic printing machine. 4,110,035, Cl. 355-15.000.
Kamata, Tokio: *See*—
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Kameno, Yoshito: *See*—
Kojima, Atsuyuki; Katsube, Junki; Kameno, Yoshito; Inaba, Shigeho; and Yamamoto, Hisao, 4,110,376, Cl. 260-570.00R.
Kameswaran, Venkatamaran: *See*—
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Kamiya, Kazuo: *See*—
Yamada, Yasuo; Kamiya, Kazuo; Katayama, Iwao; Motobayashi, Kozo; and Yonemura, Yoshiaki, 4,109,451, Cl. 57-56.000.
Kamiya, Takashi; Tanaka, Kunihiko; and Shiokawa, Youichi, to Fujisawa Pharmaceutical Co., Ltd. Product and preparation of 1H-tetrazole-5-thiol derivatives. 4,110,338, Cl. 260-308.00D.
Kammann, Wilfried: *See*—
Strauch, Karl; and Kammann, Wilfried, 4,109,573, Cl. 101-38.00R.
Kanai, Masashi: *See*—
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Kanazawa, Hiroyuki: *See*—
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Kaneko, Hideaki: *See*—
Matsushima, Yasunobu; Yashiro, Kuniji; Kaneko, Hideaki; and Suzuki, Masanori, 4,110,129, Cl. 148-6.15R.
Kangas, Karl-Erik: *See*—
Svanstrom, Alf Henrik; and Kangas, Karl-Erik, 4,109,974, Cl. 308-8.200.
Kanner, Bernard; and Prokai, Bela, to Union Carbide Corporation. Formation of polyurethane foam in the presence of sulfolanyl-bearing polysiloxane-polyoxyalkylene polymers. 4,110,271, Cl. 521-111.000.
Kanner, Bernard; and Prokai, Bela, to Union Carbide Corporation. Formation of high-resilience urethane foam in the presence of sulfolanyloxy alkyl-polyalkylsiloxanes. 4,110,272, Cl. 521-111.000.
Kantorowicz, Gerard: *See*—
Bert, Alain; and Kantorowicz, Gerard, 4,110,839, Cl. 365-180.000.
Kaplow, Roy; and Frank, Robert I., to Massachusetts Institute of Technology. High-intensity, solid-state-solar cell device. 4,110,122, Cl. 136-89.00P.
Karl Ruggli AG: *See*—
Ronc, Marcel, 4,109,354, Cl. 28-119.000.
Kartell, S.p.A.: *See*—
Polvara, Giulio, 4,110,052, Cl. 403-295.000.
Kaszerman, Philip, to International Telephone & Telegraph Corporation. Capture protection for pulse signal tracking system. 4,110,756, Cl. 343-7.300.
Katada, Michihisa; Hayashi, Katsutake; Katsura, Hakuji; Tomita, Kenichi; Morohoshi, Hideo; Uehara, Keiichi; and Tanaka, Hiroshi, to Shiseido Co., Ltd. Method for improving the quality of the fragrance of perfumes using aliphatic dibasic acid diesters. 4,110,626, Cl. 252-522.000.
Katayama, Iwao: *See*—
Yamada, Yasuo; Kamiya, Kazuo; Katayama, Iwao; Motobayashi, Kozo; and Yonemura, Yoshiaki, 4,109,451, Cl. 57-56.000.
Kato, Eiichi: *See*—
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Kato, Toshiro: *See*—
Takayama, Chiyozo; Yamamoto, Shigeo; Kato, Toshiro; Hisada, Yoshio; and Fujinami, Akira, 4,110,462, Cl. 424-273.00R.
Katsube, Junki: *See*—
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Katsura, Hakuji: *See*—
Katada, Michihisa; Hayashi, Katsutake; Katsura, Hakuji; Tomita, Kenichi; Morohoshi, Hideo; Uehara, Keiichi; and Tanaka, Hiroshi, 4,110,626, Cl. 252-522.000.
Katzin, Lawrence F. Modular baseboard molding. 4,109,434, Cl. 52-287.000.
Kaufmann, Karl-Ernst: *See*—
Becker, Klaus; Cittrich, Jurgen; and Kaufmann, Karl-Ernst, 4,109,904, Cl. 272-56.50R.
Kawabata, Masuo: *See*—
Maeda, Kazuo; Noguchi, Katuichi; Kawabata, Masuo; Sato, Shigehiko; and Sato, Yukio, 4,109,663, Cl. 131-2.000.
Kawagoe, Akira: *See*—
Kondo, Tatsuo; Shindo, Masami; Ohmura, Taizo; Yonezawa, Noboru; Kawagoe, Akira; and Kojima, Toshio, 4,110,110, Cl. 75-122.000.
Kawakami, Hiromi: *See*—
Hongu, Masayuki; Tokuhara, Masaharu; and Kawakami, Hiromi, 4,110,635, Cl. 307-233.00R.
Kawakami, Kunio, to Kencor Sports, Inc. Fishing reel drag wheel. 4,109,882, Cl. 242-217.000.
Kawamura, Hideo; and Kubota, Kimi, to Isuzu Motors Limited. Exhaust gas purifying device for internal combustion engine with auxiliary combustion chambers. 4,109,625, Cl. 123-119.00A.
Kawasaki Jukogyo Kabushiki Kaisha: *See*—
Fujikawa, Tetsuzo; and Fujii, Noriaki, 4,109,622, Cl. 123-73.00A.
Kawasaki Steel Corporation: *See*—
Akutsu, Shoji; Watanabe, Yasumasa; Mashino, Yasuhiko; Chaki, Tomohiro; and Fujita, Masakazu, 4,110,048, Cl. 356-200.000.
Kazda, Stanislav: *See*—
Hiltmann, Rudolf; Heise, Arend; Kazda, Stanislav; and Hoffmeister, Friedrich, 4,110,472, Cl. 424-330.000.
Keddy, James R.: *See*—
Cronshaw, David; Shemer, Jack E.; Turner, William D.; Hartke, David; Keddy, James R.; DuVall, Wilbur E.; and Sterling, Warren M., 4,110,823, Cl. 364-200.000.
Keech, Dana E.: *See*—
Keech, Roger A., 4,109,466, Cl. 60-487.000.
Keech, Roger A., to Keech, Dana E.; and Mullisen, Ronald S., part interest to each. Hydraulic transmission. 4,109,466, Cl. 60-487.000.
Keegan, Partick J., to Rho Sigma. Solar heating system. 4,109,639, Cl. 126-271.000.
Keller, Hans: *See*—
Mollgaard, Klaus; Keller, Hans; Sendtko, Ulrich; and Sommer, Rudiger, 4,110,826, Cl. 364-526.000.
Keller, Robert B., to Weisman & Allen. Automatic blood pressure cuff applicator. 4,109,646, Cl. 128-2.05C.
Kemlite Corporation: *See*—
Morse, Donald B., 4,110,151, Cl. 156-519.000.
Kemp, Grey Charles; and Spence, Eion Murray, to Canadian General Electric Company Limited. Brushholder supporting structure. 4,110,650, Cl. 310-239.000.
Kempchen & Co. GmbH: *See*—
Tuckmantel, Hans-Joachim, 4,109,923, Cl. 277-101.000.
Kemper, Kate. Dough makeup line for the selective production of different kinds of bread. 4,109,569, Cl. 99-483.000.
Kencor Sports, Inc.: *See*—
Kawakami, Kunio, 4,109,882, Cl. 242-217.000.
Kendall, Clarence E., Jr.: *See*—
Moore, Boyd B.; and Kendall, Clarence E., Jr., 4,110,554, Cl. 174-101.500.
Kendall Company, The: *See*—
Taylor, Glenn N., 4,109,837, Cl. 222-556.000.
Kennecott Copper Corporation: *See*—
Frankiewicz, Theodore C., 4,110,106, Cl. 75-1.00R.
Kennedy, James: *See*—
Clark, John Colin; Kennedy, James; Long, Alan Gibson; and Weir, Niall Galbraith, 4,110,534, Cl. 544-16.000.
Kennedy, Jesse: *See*—
West, Vallie D.; and Kennedy, Jesse, 4,109,698, Cl. 157-1.200.
Kennedy, Robert R.: *See*—
Lindemann, Martin K. O.; Kennedy, Robert R.; and Verdicchio, Robert J., 4,110,263, Cl. 252-545.000.
Kennis, Ludo E. J.: *See*—
Vandenberk, Jan; Kennis, Ludo E. J.; Van der Aa, Marcel J. M. C.; and Van Heertum, Albert H. M. Th., 4,110,333, Cl. 260-293.570.
Kerfante, Rene, to Eltra Corporation. Character holder. 4,110,763, Cl. 354-14.000.

Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung: *See*—
Forster, Siegfried; and Kleemann, Manfred, 4,109,710, Cl. 165-165.000.
Maly, Vladimir; and Teuchert, Eberhard, 4,110,158, Cl. 176-58.0PB.
Kevotek Oy: *See*—
Kolmonen, Kalle; and Muukka, Esko, 4,109,758, Cl. 184-15.00A.
Keystone Consolidated Industries, Inc.: *See*—
Amdal, Dagfinn O., 4,109,950, Cl. 292-254.000.
Khaleeluddin, Khaja: *See*—
Sutthoff, Robert F.; MacAllister, Robert V.; and Khaleeluddin, Khaja, 4,110,164, Cl. 195-63.000.
Kidd, John A. Means for detecting leakage in the inner lining of tanks and piping. 4,110,739, Cl. 340-605.000.
Kihara, Keiichi: *See*—
Tamabayashi, Hanzo; Hattori, Tatsuo; Tanaka, Tetsuo; Oda, Yasuhiro; and Kihara, Keiichi, 4,110,366, Cl. 260-505.00N.
Kijima, Yoshihiko: *See*—
Imanaka, Hiroshi; Kijima, Yoshihiko; Sugitawa, Chikara; and Sumoto, Misao, 4,110,411, Cl. 260-873.000.
Kikuchi, Kazuo: *See*—
Konishi, Masami; Nakamura, Norihiko; Itou, Takaaki; and Kikuchi, Kazuo, 4,110,417, Cl. 261-39.00A.
Kim, Hyun Jung, to Diamond, Steven M., a part interest. Specimen transfer container. 4,109,530, Cl. 73-427.000.
Kimberly-Clark Corporation: *See*—
Mitchell, Kenneth J.; and Ostermeier, Kurt W., 4,109,353, Cl. 28-104.000.
Kimura, Kyozo: *See*—
Hashimoto, Hiroshi; and Kimura, Kyozo, 4,109,621, Cl. 123-65.0SP.
Kindig, Guilford Edwin, to Eastman Kodak Company. Double exposure prevention mechanism. 4,110,771, Cl. 354-207.000.
King, Dallas E.: *See*—
DiLiddo, Ronald C.; and King, Dallas E., 4,109,376, Cl. 29-622.000.
King, Jack B., to General Motors Corporation. Vehicle assembly-line fueling emission control method. 4,109,687, Cl. 141-5.000.
Kinley, John C.; Anderson, Clifford E.; Agee, Charles W.; and Dieckman, Harry E., to Kinley, John C. Signal-producing pipe caliper. 4,109,386, Cl. 33-178.00F.
Kinoshita, Shouzo, to Pioneer Electronic Corporation. Speaker cabinet. 4,109,983, Cl. 312-214.000.
Kinosz, Donald L.: *See*—
LaCamera, Alfred F.; Trzeciak, Thomas A.; and Kinosz, Donald L., 4,110,178, Cl. 204-64.00R.
Kinson, Philip L., to General Electric Company. Method for purifying a dehydrochlorination mixture. 4,110,541, Cl. 568-725.000.
Kipp, Michael A.; and Brauner, Arne H., to Container Corporation of America. Tubular carton. 4,109,848, Cl. 229-21.000.
Kirchoff, Francis D., to Alco Electronic Products, Inc. Sub-miniature, two position double pole switch. 4,110,574, Cl. 200-67.00G.
Kirkup, Joseph F., to Mechanical Products. Three phase circuit breaker. 4,110,719, Cl. 337-46.000.
Kirschman, Fred C.; and Bolte, Wallace B. Home water distiller. 4,110,170, Cl. 202-160.000.
Kishi, Ikuji: *See*—
Yagi, Norio; Matsumura, Hideki; Aoyagi, Tatsuhiro; and Kishi, Ikuji, 4,110,314, Cl. 528-26.000.
Kishimoto, Tadashi: *See*—
Kiyono, Yutaka; Nagata, Shigeaki; Shigemori, Shuichiro; Kishimoto, Tadashi; Maruyama, Sadao; and Arisawa, Katsuyoshi, 4,109,999, Cl. 350-91.000.
Kita, Takeshi: *See*—
Shimada, Teizo; Kita, Takeshi; Mochizuki, Kiyoshi; and Komiya, Takahiro, 4,110,394, Cl. 264-167.000.
Kitagawa, Junji: *See*—
Akita, Sigeyuki; and Kitagawa, Junji, 4,110,740, Cl. 340-620.000.
Kiyono, Yutaka; Nagata, Shigeaki; Shigemori, Shuichiro; Kishimoto, Tadashi; Maruyama, Sadao; and Arisawa, Katsuyoshi, to Mamiya Camera Co., Ltd. Illuminating device for slit lamp microscopes. 4,109,999, Cl. 350-91.000.
Klancnik, Alvin R., to Sealy, Incorporated. Innerspring construction. 4,109,330, Cl. 5-267.000.
Klank, Otto; Rottmann, Dieter; and Wuttke, Stephan, to Licentia Patent-Verwaltungs-G.m.b.H. Tuning circuit for high frequency receivers. 4,110,695, Cl. 325-464.000.
Kleemann, Manfred: *See*—
Forster, Siegfried; and Kleemann, Manfred, 4,109,710, Cl. 165-165.000.
Klein, Andrew: *See*—
Barabas, Eugene S.; Klein, Andrew; and Alwani, Dru W., 4,110,291, Cl. 260-29.6RW.
Klein, Bernard; and Foreman, James Arthur, to Hoffmann-La Roche Inc. Determination of β-lipoproteins in blood serum with polyanethole sulfonate. 4,110,077, Cl. 23-230.00B.
Klein, Richard M.; Quackenbush, Carr Lane W.; and Kolbeck, Andrew G., to GTE Laboratories Incorporated. Optical fibers formed of aluminum borophosphate glass compositions. 4,110,002, Cl. 350-96.290.
Klein, Richard M., to GTE Laboratories Incorporated. Method of forming optical fibers. 4,110,090, Cl. 65-2.000.
Kleine, Charles A.; and Middleton, Verne L., to Olin Corporation. Heat exchange panel. 4,109,711, Cl. 165-170.000.
Kleven, Jonny Hilmer. Metal separating process and apparatus. 4,110,206, Cl. 209-43.000.
Kline, Donald C., to Schoeneck Farms, Inc. Method and apparatus for in-field processing of vegetation. 4,109,448, Cl. 56-13.500.
Kling, Miguel. Pumping device. 4,110,059, Cl. 417-424.000.
Klink, Jerome P.: *See*—
Parbhoo, Kantilal R.; Klink, Jerome P.; Calland, John P.; and White, Gerald L., 4,109,610, Cl. 118-202.000.
Klinkert, Norbert: *See*—
Burow, Burghard; and Klinkert, Norbert, 4,109,357, Cl. 28-289.000.
Klockner-Humboldt-Deutz Aktiengesellschaft: *See*—
Breuer, Bert, 4,109,746, Cl. 180-82.00A.
Klockner-Werke AG: *See*—
Geck, Hans Gunter; and Kruse, Fritz, 4,110,108, Cl. 75-48.000.
Kloften & Kloften A/S: *See*—
Ege, Sigmund, 4,110,592, Cl. 219-85.00M.
Klygis, Mindaugas Julius; and Olsen, Robert Charles, to Illinois Tool Works Inc. Multipackage and carrier device. 4,109,787, Cl. 206-150.000.
Knapp, Carl Lee: *See*—
Waldron, Clifford Robert; and Knapp, Carl Lee, 4,109,990, Cl. 339-89.00M.
Knechtel, Wilhelm, to Canon Kabushiki Kaisha. Electrostatic copying apparatus. 4,110,030, Cl. 355-11.000.
Knief, Gerald L.: *See*—
Peterson, Jerry D.; and Knief, Gerald L., 4,110,603, Cl. 219-535.000.
Knifton, John F., to Texaco Inc. Process for preparing lower lactams from allylic halide substrates. 4,110,340, Cl. 260-326.5FL.
Knox Manufacturing Company: *See*—
Zinn, Robert W., 4,110,003, Cl. 350-117.000.
Knuttel, Berthold: *See*—
Bergmann, Wilfried; and Knuttel, Berthold, 4,110,680, Cl. 324-0.50B.
Kobayashi, Akira; Chiba, Kunji; Miyamoto, Noriaki; Shiraki, Masao; and Furukawa, Naotake, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Spinning rotor utilized for an open-end spinning apparatus. 4,109,452, Cl. 57-58.890.
Kobayashi, Akira; Chiba, Kunji; Miyamoto, Noriaki; Shiraki, Masao; and Furukawa, Naotake, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Fiber separating device of an open-end spinning apparatus. 4,109,453, Cl. 57-58.910.
Kobayashi, Osamu: *See*—
Ichikawa, Yataro; Kobayashi, Osamu; Soma, Kazuhiko; Naruchi, Tatuyuki; Yamanaka, Yoshiyuki; and Suzuki, Nobuo, 4,110,403, Cl. 260-603.00R.
Kobe Steel, Ltd.: *See*—
Furuta, Isao; and Takiguchi, Yoshimi, 4,110,183, Cl. 204-157.10R.
Kobori, Tetsuo: *See*—
Hayashi, Kiyozumi; Ohta, Takeo; and Kobori, Tetsuo, 4,110,160, Cl. 176-78.000.
Koch, Hans W., to Roller Bearing Company of America. Self-aligning bushing. 4,109,976, Cl. 308-36.100.
Koch, Werner Lutz. Enossal implant. 4,109,382, Cl. 32-10.00A.
Kodama, Yutaka: *See*—
Saikawa, Isamu; Takano, Shuntaro; Yoshida, Chosaku; Takashima, Okuta; Momonoi, Kaishu; Kurodo, Seietsu; Komatsu, Miwako; Yasuda, Takashi; and Kodama, Yutaka, 4,110,327, Cl. 544-385.000.
Koenig, Walter: *See*—
Bauer, Karl A.; Baur, Peter F.; Biedermann, Horst H.; Madel, Andreas; Nitsch, Friedrich; Pechinger, Ernst; Koenig, Walter; Ipfelkofer, Armin; Rindsfuesser, Johann J.; and Weber, Helmut, 4,109,779, Cl. 400-584.000.
Kogel, Gerhard: *See*—
Schaub, Andres; and Kogel, Gerhard, 4,110,071, Cl. 8-21.00R.
Kohama, Tokio; Obayashi, Hideki; Ozaki, Tadashi; and Nohira, Hidetaka, to Nippon Soken, Inc.; and Toyota Jidosha Kogyo Kabushiki Kaisha. Device for purifying exhaust gas discharged from internal combustion engine. 4,109,462, Cl. 60-278.000.
Kohl, Franz; and Hoch, Walter, to Wacker-Chemitronic Gesellschaft fur Elektronik-Grundstoffe mbH. Manufacture of doped semiconductor rods. 4,110,586, Cl. 219-10.430.
Kohl, Horst: *See*—
Kuckens, Alexander; and Kohl, Horst, 4,109,829, Cl. 222-81.000.
Kojima, Atsuyuki; Katsube, Junki; Kameno, Yoshito; Inaba, Shigeho; and Yamamoto, Hisao, to Sumitomo Chemical Company, Limited. Cyclopropylmethylamine derivatives. 4,110,376, Cl. 260-570.00R.
Kojima, Gilbert K., to United States of America, National Aeronautics and Space Administration. Miniature implantable ultrasonic echosonometer. 4,109,644, Cl. 128-2.00V.
Kojima, Toshifumi: *See*—
Koshiga, Fusao; Tanaka, Jinkichi; Watanabe, Itaru; Suzuki, Motoaki; Kojima, Toshifumi; Matsubara, Hiroyoshi; Osuka, Tatsumi; Takeshige, Kenji; Nagamine, Takashi; and Hirano, Osamu, 4,110,589, Cl. 219-66.000.
Kojima, Toshio: *See*—
Kondo, Tatsuo; Shindo, Masami; Ohmura, Taizo; Yonezawa, Noboru; Kawagoe, Akira; and Kojima, Toshio, 4,110,110, Cl. 75-122.000.
Kolb, William Jordan, III; and Laurel, Karl Otto, to Liquid Controls Corporation. Maximum strength/weight fluid metering device. 4,109,525, Cl. 73-201.000.
Kolbe, William F.: *See*—
Leskovar, Branko; Buscher, Harold T.; and Kolbe, William F., 4,110,686, Cl. 324-58.50C.

Kolbeck, Andrew G.: *See*—
Klein, Richard M.; Quackenbush, Carr Lane W.; and Kolbeck, Andrew G., 4,110,002, Cl. 350-96.290.
Kolk, Erich: *See*—
Schweier, Guenther; Kolk, Erich; Mueller-Tamm, Heinz; Frielingsdorf, Hans; Bachl, Robert; and Gruber, Wolfgang, 4,110,523, Cl. 526-124.000.
Kolmonen, Kalle; and Muukka, Esko, to Kevotek Oy. Lubricating apparatus. 4,109,758, Cl. 184-15.00A.
Komaba, Shiro: *See*—
Goshima, Yoshitomo; Hattori, Hiroyuki; Komaba, Shiro; and Umezawa, Kazumi, 4,110,029, Cl. 355-10.000.
Komada, Hiroshi: *See*—
Ffooks, Roger Cambridge; and Komada, Hiroshi, 4,109,823, Cl. 220-446.000.
Komander, Gerhard: *See*—
Hoheisel, Peter-Matthias; and Komander, Gerhard, 4,110,813, Cl. 361-248.000.
Komatsu, Miwako: *See*—
Saikawa, Isamu; Takano, Shuntaro; Yoshida, Chosaku; Takashima, Okuta; Momonoi, Kaishu; Kuroda, Seietsu; Komatsu, Miwako; Yasuda, Takashi; and Kodama, Yutaka, 4,110,327, Cl. 544-385.000.
Komiya, Takahiro: *See*—
Shimada, Teizo; Kita, Takeshi; Mochizuki, Kiyoshi; and Komiya, Takahiro, 4,110,394, Cl. 264-167.000.
Kondo, Tatsuo; Shindo, Masami; Ohmura, Taizo; Yonezawa, Noboru; Kawagoe, Akira; and Kojima, Toshio, to Mitsubishi Kinzoku Kabushiki Kaisha. Nickel-base alloy excellent in corrosion resistance at high temperatures. 4,110,110, Cl. 75-122.000.
Konig, Franz: *See*—
Fehrer, Ernst; and Konig, Franz, 4,109,454, Cl. 57-58.950.
Konigsford, Barry S.; Davidson, Kenneth; and Marschak, Howard J., to International Telephone and Telegraph Corporation. Display rack and assembly of articles on the rack. 4,109,795, Cl. 211-57.100.
Konishi, Masami; Nakamura, Norihiko; Itou, Takaaki; and Kikuchi, Kazuo, to Toyota Jidosha Kogyo Kabushiki Kaisha. Variable venturi type carburetor. 4,110,417, Cl. 261-39.00A.
Konishi, Nobutake; Yokota, Takeshi; Sugawara, Yoshitaka; Yatsuo, Tsutomu; and Okamura, Masahiro, to Hitachi, Ltd. Bidirectional grooved thyristor fired by activation of the beveled surfaces. 4,110,781, Cl. 357-39.000.
Konishiroku Photo Industry Co., Ltd.: *See*—
Takahashi, Tokuji, 4,110,047, Cl. 356-200.000.
Kono, Hidehiko, to Agency of Industrial Science & Technology. Shape recognition system. 4,110,736, Cl. 340-146.3AE.
Konoshima, Katunaga, to Olympus Optical Co., Ltd. Spare lamp holding device for a light supply device for endoscope. 4,110,820, Cl. 362-207.000.
Koop, Douglas A.: *See*—
Whetstone, Clayton N.; Koop, Douglas A.; and Dowd, James D., 4,109,374, Cl. 29-599.000.
Korbach, Paul F.: *See*—
Bosniack, David S.; and Korbach, Paul F., 4,110,196, Cl. 208-13.000.
Kori, Seiji: *See*—
Hayashi, Masaki; Kori, Seiji; and Miyake, Hajimu, 4,110,341, Cl. 260-327.00C.
Kornfeld, Edmund C.: *See*—
Bach, Nicholas J.; and Kornfeld, Edmund C., 4,110,339, Cl. 260-326.900.
Koroknay, Laszlo; and Ratsko, Istvan, to Autoipari Kutato Intezet. Anti-jack-knifing apparatus for articulated vehicles. 4,109,929, Cl. 280-432.000.
Korr, Abraham L.; and Rosenblatt, David B., to United States of America, Army. Anti-missile missile. 4,109,883, Cl. 244-3.100.
Koshiga, Fusao; Tanaka, Jinkichi; Watanabe, Itaru; Suzuki, Motoaki; Kojima, Toshifumi; Matsubara, Hiroyoshi; Osuka, Tatsumi; Takeshige, Kenji; Nagamine, Takashi; and Hirano, Osamu, to Nippon Kokan Kabushiki Kaisha. Method for longitudinally seam-welding pipe-blank for welded steel pipe from the inside along a groove. 4,110,589, Cl. 219-66.000.
Koyama, Mitsuo: *See*—
Nakagawa, Tadashi; Koyama, Mitsuo; and Onda, Eiichi, 4,110,772, Cl. 354-246.000.
Onda, Eiichi; Koyama, Mitsuo; Nemoto, Ichiro; Nokagawa, Tadashi; and Watanabe, Masanori, 4,110,767, Cl. 354-152.000.
Kozam, George; and Romanelli, Pat. Successive delivery multiple barrel syringe. 4,109,653, Cl. 128-218.00R.
Kozima, Toyoo, to Hidaka Engineering Co., Ltd. Method for the production of heat exchanger fins. 4,109,501, Cl. 72-327.000.
Krabetz, Richard: *See*—
Engelbach, Heinz; Krabetz, Richard; Duembgen, Gerd; Willersinn, Carl-Heinz; Frey, Walter; Lebert, Ulrich; and Thiessen, Fritz, 4,110,370, Cl. 260-530.00N.
Kraft, Derald H., to Aspro, Inc. Spun V-grooved sheet pulley with thick hub wall integral with thin side wall. 4,109,542, Cl. 74-230.800.
Kraftwerk Union Aktiengesellschaft: *See*—
Bergmann, Wilfried; and Knuttel, Berthold, 4,110,680, Cl. 324-0.50B.
Kranz, Walter; and Hohnecker, Lynn, to Messerschmitt-Bolkow-Blohm GmbH. Apparatus and method for storing pressure gas in a reservoir of a projectile. 4,109,884, Cl. 244-3.220.
Krasnovskaya, Tatyana Sergeevna, administratrix: *See*—
Vorona, Dmitry Afanasievich; Chikul, Vitaly Ivanovich; Smirnov, Alexandr Stepanovich; Chikul, Olga Semenovna; Yagunov, Boris Ivanovich; Tager, Semen Alexandrovich; Shipkov, Nikolai Nikolaevich; Perepelkin, Arkady Vitalievich; Grigorieva, Elizaveta Alexeevna; Krasnovsky, Gennady Alexeevich, deceased; and Krasnovskaya, Tatyana Sergeevna, administratrix, 4,110,064, Cl. 431-171.000.
Krasnovsky, Gennady Alexeevich, deceased: *See*—
Vorona, Dmitry Afanasievich; Chikul, Vitaly Ivanovich; Smirnov, Alexandr Stepanovich; Chikul, Olga Semenovna; Yagunov, Boris Ivanovich; Tager, Semen Alexandrovich; Shipkov, Nikolai Nikolaevich; Perepelkin, Arkady Vitalievich; Grigorieva, Elizaveta Alexeevna; Krasnovsky, Gennady Alexeevich, deceased; and Krasnovskaya, Tatyana Sergeevna, administratrix, 4,110,064, Cl. 431-171.000.
Kratochvil, John R., Jr., to Boise Cascade Corporation. Suspension means for furniture shipping package. 4,109,876, Cl. 206-326.000.
Kray, Gerald L.: *See*—
Richeson, William E., Jr.; and Kray, Gerald L., 4,109,630, Cl. 123-148.00E.
Krehbiel, Vivian D.; and Haas, Ralph L., to Kreonite, Inc. Film guide for film processing equipment. 4,110,774, Cl. 354-345.000.
Kreonite, Inc.: *See*—
Krehbiel, Vivian D.; and Haas, Ralph L., 4,110,774, Cl. 354-345.000.
Kriege, Richard P., to Lowrance Electronics, Inc. Method of manufacturing transducer. 4,110,727, Cl. 340-10.000.
Kroeger, Joseph H.: *See*—
Sarkissian, Vahe A.; Jayakumar, Nagab; Kroeger, Joseph H.; and Schlageter, Jeffrey M., 4,110,842, Cl. 365-233.000.
Krofchak, David. Method of treating a waste liquid containing polluting compounds. 4,110,212, Cl. 210-53.000.
Krohn, Hans Guenther; Rademacher, Friedrich; Petri, Ulrich; and Deubel, Hans D., to H & K, Inc. Apparatus for filling and crowning bottles. 4,109,446, Cl. 53-282.000.
Krumkalns, Eriks Viktors: *See*—
Benefiel, Robert Lee; and Krumkalns, Eriks Viktors, 4,110,099, Cl. 71-76.000.
Kruse, Fritz: *See*—
Geck, Hans Gunter; and Kruse, Fritz, 4,110,108, Cl. 75-48.000.
Krygowski, Matthew A., to International Business Machines Corporation. Channel storage adapter. 4,110,830, Cl. 364-200.000.
Kuboshima, Makoto: *See*—
Fujita, Susumu; Hamada, Yoichi; and Kuboshima, Makoto, 4,110,766, Cl. 354-106.000.
Kubota, Kimi: *See*—
Kawamura, Hideo; and Kubota, Kimi, 4,109,625, Cl. 123-119.00A.
Kubota Ltd.: *See*—
Murayama, Yoshinobu, 4,109,550, Cl. 74-691.000.
Kubota, Naohiro: *See*—
Minagawa, Motonobu; Kubota, Naohiro; and Shibata, Toshihiro, 4,110,306, Cl. 260-45.80N.
Kuchenmeister, Rolf: *See*—
Freitag, Dieter; Tresper, Erhard; Kuchenmeister, Rolf; and Beer, Wolfgang, 4,110,540, Cl. 568-718.000.
Kucher, Robert C.; and Dahl, Terence W. Method of making a unitary frame for a winch. 4,109,598, Cl. 113-116.0HH.
Kuckens, Alexander; and Kohl, Horst, to DAGMA Deutsche Automaten- und Getrankemaschinen- Gesellschaft mit beschrankter Haftung & Co. Container for metered dispensing of liquid. 4,109,829, Cl. 222-81.000.
Kudamatsu, Akio: *See*—
Saito, Junichi; Kudamatsu, Akio; Kume, Toyohiko; Shiokawa, Kozo; and Tsuboi, Shinichi, 4,110,440, Cl. 424-207.000.
Kufrin, Robert J.: *See*—
Longley, Kermit D.; Herke, Robert; and Kufrin, Robert J., 4,110,268, Cl. 521-177.000.
Kuhar, George A., to Goodyear Tire & Rubber Company, The. Thermoplastic high acrylonitrile resins. 4,110,413, Cl. 260-879.000.
Kuhn, Johannes Andries; and Wilkinson, Randolph James, to Lever Brothers Company. Antiperspirant composition. 4,110,428, Cl. 424-46.000.
Kume, Toyohiko: *See*—
Saito, Junichi; Kudamatsu, Akio; Kume, Toyohiko; Shiokawa, Kozo; and Tsuboi, Shinichi, 4,110,440, Cl. 424-207.000.
Kummer, Horst; and Beckmann, Ruediger. Pharmaceutical composition comprising d,l-α-methyl-thyroxine ethyl ester and the salts thereof and the control of cholesterol and triglyceride blood level therewith. 4,110,470, Cl. 424-309.000.
Kunii, Nobuaki: *See*—
Abe, Takeshi; Ichimura, Masahiko; Noshiro, Makoto; Kunii, Nobuaki; and Ito, Yasumichi, 4,110,308, Cl. 260-45.75C.
Kunioka, Kazuo; Noguchi, Takao; and Sato, Hiroaki, to Nippon Kokan Kabushiki Kaisha. Method of apparatus for cooling inner surface of metal pipe. 4,110,092, Cl. 62-64.000.
Kunkle, Albert C.; Abercrombie, William Floyd, Jr.; and Akins, Charles John, Jr., to J. M. Huber Corporation. Electro-osmotic/phoretic process for concentrating clay. 4,110,189, Cl. 204-180.00R.
Kunz, Peter, to Mettler Instrument AG. Weighing apparatus including lever-connected compensation coil means. 4,109,738, Cl. 177-212.000.
Kurahashi, Takeo; Maeda, Shigeo; Seki, Sanai; Suzuki, Nobuo; and Sakai, Takayuki, to Hodogaya Chemical Co., Ltd. Heat transfer printing on acidic modified synthetic fiber. 4,110,070, Cl. 8-2.50R.
Kurmeier, Hans-Adolf: *See*—
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Honjo, Yoshihiko; and Kuroda, Junji, 4,110,607, Cl. 250-201.000.

Kuroda, Seietsu: *See—*
Saikawa, Isamu; Takano, Shuntaro; Yoshida, Chosaku; Takashima, Okuta; Momonoi, Kaishu; Kuroda, Seietsu; Komatsu, Miwako; Yasuda, Takashi; and Kodama, Yutaka, 4,110,327, Cl. 544-385.000.

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Okamoto, Jiro; Hirose, Mamoru; Miyamoto, Katsuji; and Kuroki, Shinichiro, 4,110,596, Cl. 219-124.400.

Kushman, Robert L.; and Ling, Sumy H. C., to Stacey Manufacturing Co., The. Explosion vent and method of venting. 4,109,819, Cl. 220-208.000.

Kutik, Louis F.; and Cecil, Howard E., to Security Plastics, Inc. Pumping system having a pressure release. 4,109,832, Cl. 222-318.000.

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Darms, Roland; Kvita, Vratislav; and Greber, Gerd, 4,110,188, Cl. 204-159.220.

Kwikee Enterprises, Inc.: *See—*
Nagy, Emery James; and MacDonald, Rodney A., 4,110,673, Cl. 318-466.000.

Kwok, Clyde C. K.; and Farag, Essam A., to Canadian Patents and Development Limited. Constant volume fluid discharging device. 4,109,834, Cl. 222-448.000.

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Graf Vom Hagen, Siegbert, 4,110,667, Cl. 313-143.000.

Kyoritsu Yuki Co., Ltd.: *See—*
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LaBrie, Paul J. Apparatus for producing analog-to-digital conversions. 4,110,747, Cl. 340-347.0NT.

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Lacchia, Adrien. Electrostatic powder coating method. 4,110,486, Cl. 427-27.000.

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Laesser, Claude; and Portmann, Hubert, to Ebauches S.A. Universal electronic timepiece. 4,109,457, Cl. 58-43.000.

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Lagow, Richard J.; Shimp, Lawrence A.; and Clark, Leland C., Jr., to Suntech, Inc.; and Children's Hospital Medical Center. Tetramethylpentane blood substitutes. 4,110,474, Cl. 424-350.000.

Lala, Robert J., to Lever Brothers Company. Reduced-staining colorant system. 4,110,238, Cl. 252-89.00B.

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Brambilla, Marco; and Lallia, Pascal, 4,110,595, Cl. 219-121.00P.

Lames Societa per Azioni: *See—*
Fogarollo, Pier Paolo, 4,109,417, Cl. 49-352.000.

Lamport, Ivan R.: *See—*
Bartlett, Harold H.; Herr, Charles H., Jr.; and Lamport, Ivan R., 4,109,519, Cl. 73-135.000.

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Murphy, Philip Joseph, 4,110,066, Cl. 431-320.000.

Lancaster, Kenneth D., Jr.: *See—*
Payne, Larry E.; and Lancaster, Kenneth D., Jr., 4,109,817, Cl. 220-90.200.

Lane, Gilbert M. Utility cart. 4,109,926, Cl. 280-39.000.

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Lange, Karl-Heinz, to Balda-Werke Photographische Gerate und Kunststoff GmbH & Co. KG. System for mounting accessories on a camera. 4,110,770, Cl. 354-202.000.

Langerwerf, Josephus Sychbertus: *See—*
Carter, Alan Reginald; Pettit, Donald; and Langerwerf, Josephus Sychbertus, 4,110,495, Cl. 427-400.000.

Langle, Juan Pedro; and Langle, Miguel Juan. Vacuum-operated liquid pump. 4,110,058, Cl. 417-395.000.

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Langle, Juan Pedro; and Langle, Miguel Juan, 4,110,058, Cl. 417-395.000.

Lankro Chemicals Group Limited: *See—*
Tennant, David John; Sheridan, Geoffrey Philip; and Steel, Alistair James, 4,110,213, Cl. 210-59.000.

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Chesler, Edwin T.; Goodman, Donald; and Lapkin, Milton, 4,110,527, Cl. 526-235.000.

Lapp, John; and Sadler, Fred S., to McGraw-Edison Company. Dielectric system for an electrical apparatus. 4,110,496, Cl. 428-500.000.

Lappe, Donald L.: *See—*
Stern, Michael D.; and Lappe, Donald L., 4,109,647, Cl. 128-2.05F.

Larke, John Reginald; Barber, Colin; and Cotterill, David John, to National Research Development Corporation. Electrode assemblies. 4,109,648, Cl. 128-2.06E.

Laroche, Jean Pierre. Form panel spacing device. 4,109,893, Cl. 249-175.000.

Larsen, Gregory J.; and Hiszpanski, Jan A., to FMC Corporation. Unidirectional flow pickup hood for street sweepers. 4,109,341, Cl. 15-340.000.

Larson, Daniel A., to Westinghouse Electric Corp. Method for mounting electrodes in high pressure sodium lamps and resulting article. 4,110,656, Cl. 313-331.000.

Laubin, Jurgen: *See—*
Baumgartner, Alfons; Berg, Walter; Burkhardt, Horst; Laubin, Jurgen; and Schlick, Helmut, 4,110,828, Cl. 364-562.000.

Lauder, Alan; and McCann, Elrey L., III, to Du Pont de Nemours, E. I., and Company. Metal oxyhalide catalytic compositions. 4,110,251, Cl. 252-442.000.

Lauder, Alan, to Du Pont de Nemours, E. I., and Company. Metal oxide catalytic compositions. 4,110,254, Cl. 252-462.000.

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Laurel, Karl Otto: *See—*
Kolb, William Jordan, III; and Laurel, Karl Otto, 4,109,525, Cl. 73-201.000.

Laurent, Francois: *See—*
Bohm, Kurt; Rollenitz, Leopold; and Laurent, Francois, 4,110,005, Cl. 350-184.000.

Lautjarvi, Jaakko; and Eriksson, Raimo. Method and a device for adding solid, powdered or grained material to melted metal. 4,109,898, Cl. 266-217.000.

Lavender, Ardis R. Plate type fluid distributing device. 4,109,680, Cl. 137-599.000.

Lavender, Ardis R. Mass transfer device. 4,110,220, Cl. 210-321.00R.

Lawford, Victor N.; and Sacarisen, David F., to International Telephone and Telegraph Corporation. Fluid sensing systems. 4,109,531, Cl. 73-438.000.

Lawonn, Horst: *See—*
Demmler, Kurt; Lawonn, Horst; and Hesse, Anton, 4,110,278, Cl. 260-17.00A.

Lawrence Brothers, Inc.: *See—*
Strozier, Robert E., 4,109,346, Cl. 16-151.000.

Lawrence, John P., to Goodyear Tire & Rubber Company, The. Thiocarbamate additives for sulfur vulcanizable polymers. 4,110,319, Cl. 526-17.000.

Leach, Bruce E., to Continental Oil Company. Method for the disproportionation of highly alkylated phenols with phenol. 4,110,253, Cl. 252-457.000.

Leary, Patrick John; and Shaffer, Harry Leonard, to GTE Sylvania Incorporated. Communication apparatus. 4,110,560, Cl. 179-1.CVC.

Lebert, Ulrich: *See—*
Engelbach, Heinz; Krabetz, Richard; Duembgen, Gerd; Willersinn, Carl-Heinz; Frey, Walter; Lebert, Ulrich; and Thiessen, Fritz, 4,110,370, Cl. 260-530.00N.

Lecha, Manuel Julian: *See—*
Salvat Dalmau, Juan; and Lecha, Manuel Julian, 4,110,118, Cl. 106-25.000.

Ledeen Flow Control Systems: *See—*
Ledeen, Howard L.; and Schmon, Franz, 4,109,512, Cl. 73-40.50R.

Ledeen, Howard L.; and Schmon, Franz, to Ledeen Flow Control Systems. Linebreak detection system. 4,109,512, Cl. 73-40.50R.

Leduc, Robert D., to Polaroid Corporation. Latch assembly for film loading door. 4,109,947, Cl. 292-76.000.

Lee, Geoffrey M.: *See—*
Ho, Bin-Lun; and Lee, Geoffrey M., 4,110,802, Cl. 360-106.000.

Lee, Harvey Robert, to Canadian General Electric Company Limited. Method of fabricating nuclear fuel. 4,110,159, Cl. 176-68.000.

Lee, John M.: *See—*
Bauman, William C.; Lee, John M.; and Watson, John D., 4,110,402, Cl. 423-166.000.

Lee, Lien-Mow: *See—*
Edging, Robert Ray; and Lee, Lien-Mow, 4,110,316, Cl. 526-68.000.

Lee, Minyoung; and Szala, Lawrence E., to General Electric Company. Composite of bonded cubic boron nitride crystals on a silicon carbide substrate. 4,110,084, Cl. 51-307.000.

Lee, Richard G. Horizontal cartoning machine. 4,109,444, Cl. 53-186.000.

Lee, Yu-Sun; and Shackle, Dale Richard, to Mead Corporation, The. Process for the production of a pressure-sensitive carbonless copy sheet using microcapsules formed in situ in a radiation curable binder. 4,110,511, Cl. 428-307.000.

Leenerts, Virgil G. Standing wave ratio measurement instrument. 4,110,685, Cl. 324-58.00B.

Legille, Edouard, to S.A. des Anciens Etablissements Paul Wurth. Infra-red profilometer. 4,110,617, Cl. 250-342.000.

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Dubil, James F.; Leighton, Howard N.; and Wilfinger, Raymond J., 4,110,835, Cl. 364-844.000.

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Forster, Karl-Heinz; Lein, Werner; and Heiber, Hartmut, 4,109,574, Cl. 101-216.000.

Leininger, Joel Calvin; and Taylor, George Phillips, to International Business Machines Corporation. Carry save adder. 4,110,832, Cl. 364-786.000.

Leitz, Ludwig, to Ernst Leitz Wetzlar GmbH. Method and apparatus for photoelectrically determining the position of at least one focal plane of an image. 4,110,042, Cl. 356-4.000.

Lemelson, Jerome H. Magnetic tape transducing apparatus. 4,110,801, Cl. 360-96.000.

Lender, Adam, to GTE Automatic Electric Laboratories, Incorporated. Apparatus and method for detecting errors in a 7-level correlative signal. 4,110,691, Cl. 325-41.000.

Lenz, George R.; and Schulz, John A., to G. D. Searle & Co. 21-(Acetyloxy)-3-oxo-24-norchola-4,20(22)-diene-23-nitrile and intermediates thereto. 4,110,325, Cl. 260-239.55C.

Leo, Thomas J.; and Johansson, Anders H., to Wyrough and Loser, Inc. Coprecipitation process. 4,110,240, Cl. 252-182.000.

Leon Moyano, Rafael. Vehicle parking system with a plurality of movable colums having vehicle supporting floors. 4,109,804, Cl. 214-16.1CB.

Leonard, James H., Jr., to Allied Industries Inc. Method of discharging particulate material from a hopper. 4,109,827, Cl. 222-1.000.

Lepore, Henry D.; and Saidman, Perry J., to Lepore, Henry D. Anti-theft starting system. 4,110,734, Cl. 340-64.000.

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Drouin, Claude, 4,109,637, Cl. 126-197.000.

Les Products Associes LPA SA: *See—*
Peclard, Michel, 4,109,650, Cl. 128-66.000.

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Lester, Robert W.; and Hotto, Robert, to Static Systems Corporation. Electronic typewriter using a solid state display to print. 4,110,794, Cl. 358-256.000.

Lever Bros. Co.: *See—*
Prince, Leon M., 4,110,239, Cl. 252-135.000.

Lever Brothers Company: *See—*
Kuhn, Johannes Andries; and Wilkinson, Randolph James, 4,110,428, Cl. 424-46.000.
Lala, Robert J., 4,110,238, Cl. 252-89.00B.

Levi Strauss & Co.: *See—*
Blessing, Hubert, 4,109,596, Cl. 112-121.110.

Levina, Tamara Grigorievna: *See—*
Akutin, Modest Sergeevich; and Levina, Tamara Grigorievna, 4,110,395, Cl. 264-210.00R.

Levine, Samuel W.: *See—*
Hascoe, Norman; and Levine, Samuel W., 4,109,818, Cl. 220-200.000.

Lewis, Donald R.: *See—*
Barecki, Chester J.; Lewis, Donald R.; and Camp, Terry L., 4,109,959, Cl. 297-216.000.

Lewis, John C., Jr., to Tucel Industries, Inc. Picking device. 4,109,965, Cl. 300-7.000.

Libbey-Owens-Ford Company: *See—*
Oelke, Waldemar W.; Boehm, Hans W.; and Herrington, Richard A., 4,109,840, Cl. 225-2.000.

Licentia Patent-Verwaltungs-G.m.b.H.: *See—*
Klank, Otto; Rottmann, Dieter; and Wuttke, Stephan, 4,110,695, Cl. 325-464.000.

Lichfield, William H. Grinding mill. 4,109,873, Cl. 241-56.000.

Lieb, A. Calvin, Jr. Protective cabinet. 4,109,985, Cl. 312-262.000.

Lien, Jih-Chang: *See—*
Rao, G. R. Mohan; Stanczak, John S.; Lien, Jih-Chang; and Bhatia, Shyam, 4,110,776, Cl. 357-23.000.

Liepa, Alexander L.; and Japikse, Cornelis H., to Procter & Gamble Company, The. Beverage carbonation device. 4,110,255, Cl. 252-455.00Z.

Lifshin, Eric: *See—*
Ligon, Woodfin V., Jr.; and Lifshin, Eric, 4,110,612, Cl. 250-281.000.

Ligett Group Inc.: *See—*
Norman, Vello; and Moogalian, Charles M., 4,109,666, Cl. 131-261.00B.

Ligon, Woodfin V., Jr.; and Lifshin, Eric, to General Electric Company. Mass spectrometer desorption device including field anode eutectic alloy wire and auxiliary electrical resistance heating means. 4,110,612, Cl. 250-281.000.

Lin, Kou Chi; and Woods, Edmund E., to Westinghouse Electric Corp. Method of making adhesive coated electrical conductors. 4,109,375, Cl. 29-605.000.

Linde Aktiengesellschaft: *See—*
Daeschler, Werner; and Rainer, Hans, 4,110,091, Cl. 62-54.000.

Lindemann, Martin K., to Chas. S. Tanner Co. Thermosetting vinyl ester emulsion copolymers. 4,110,289, Cl. 260-29.6TA.

Lindemann, Martin K. O.; Kennedy, Robert R.; and Verdicchio, Robert J., to Johnson & Johnson Baby Products Company. Mild cleansing compositions containing alkyleneoxylated bisquaternary ammonium compounds. 4,110,263, Cl. 252-545.000.

Lindsay, Geoffrey Andrew; and Stricharczuk, Paul Thomas, to B. F. Goodrich Company, The. Thermoplastic polymer blends of ethylene-propylene (EP) copolymer with polyethylene. 4,110,414, Cl. 260-897.00A.

Ling, Sumy H. C.: *See—*
Kushman, Robert L.; and Ling, Sumy H. C., 4,109,819, Cl. 220-208.000.

Lipha, Lyonnaise Industrielle Pharmaceutique: *See—*
Szarvasi, Etienne, 4,110,337, Cl. 260-308.00R.

Liquid Controls Corporation: *See—*
Kolb, William Jordan, III; and Laurel, Karl Otto, 4,109,525, Cl. 73-201.000.

Lissau, Frederic: *See—*
Horowitz, Charles; and Lissau, Frederic, 4,109,673, Cl. 137-381.000.

Litovitz, Theodore A.: *See—*
Macedo, Pedro B.; and Litovitz, Theodore A., 4,110,093, Cl. 65-3.00R.
Macedo, Pedro B.; and Litovitz, Theodore A., 4,110,096, Cl. 65-30.00R.

Litton Systems, Inc.: *See—*
Day, Walter Ransom, Jr., 4,110,709, Cl. 333-6.000.
Fagan, Louis E., 4,110,651, Cl. 310-239.000.
Spencer, David R., 4,110,795, Cl. 358-260.000.

Lockheed Aircraft Corporation: *See—*
Cronin, Michael Joseph, 4,110,809, Cl. 361-95.000.
Wirt, Leslie Spencer, 4,109,750, Cl. 181-224.000.

Login, Robert Bernard: *See—*
Newkirk, David Dudley; Login, Robert Bernard; and Thir, Basil, 4,110,227, Cl. 252-8.900.

Lohnherr, Ludger, to Polysius AG. Method and apparatus for processing abrasive material. 4,109,871, Cl. 241-24.000.

Lombardi, Anthony Joseph, to Barney Knitting Machinery Co., Inc. Method for sealing plastic films and the like. 4,110,145, Cl. 156-218.000.

Lombardi, Anthony Joseph, to International Telephone & Telegraph Corporation. Electro/mechanical enclosure with magnetic cover means. 4,110,552, Cl. 174-35.0MS.

Lombardo, Michael S.: *See—*
Grunwald, John J.; D'Ottavio, Eugene D.; Rhodenizer, Harold L.; and Lombardo, Michael S., 4,110,147, Cl. 156-306.000.

Long, Alan Gibson: *See—*
Clark, John Colin; Kennedy, James; Long, Alan Gibson; and Weir, Niall Galbraith, 4,110,534, Cl. 544-16.000.

Long, Douglas A.; and Burke, Frederick A. Mobile information display system. 4,110,792, Cl. 358-240.000.

Longley, Kermit D.; Herke, Robert; and Kufrin, Robert J., to Witco Chemical Corporation. Polyether polyols and polyurethane foams made therefrom. 4,110,268, Cl. 521-177.000.

Longuepee, Michel; and Dreulle, Noel, to International Lead Zinc Research Organization, Inc. Procedure for depositing a protective precoating on surfaces of zinc-coated ferrous metal parts against corrosion in presence of water. 4,110,127, Cl. 148-6.15Z.

Longuepee, Michel: *See—*
Dreulle, Paule; Longuepee, Michel; and Dhaussy, Dominique, 4,110,128, Cl. 148-6.15Z.

Lord Corporation: *See—*
Ferralli, Michael W., 4,109,752, Cl. 181-252.000.

Lorimor, Larry W.: *See—*
Junck, John A.; and Lorimor, Larry W., 4,109,561, Cl. 91-451.000.

Los, Marinus, to American Cyanamid Company. Dihydroimidazoisoindolediones and the use thereof as herbicidal agents. 4,110,103, Cl. 71-92.000.

Lovatt, William John, to Acme Marls Limited. Support structure for ceramic ware. 4,110,069, Cl. 432-258.000.

Loveless, Frederick C.; and Nudenberg, Walter, to Uniroyal, Inc. Antioxidant stabilized lubricating oils. 4,110,234, Cl. 252-47.500.

Loveless, John H.; and Phillips, Claude T., to Gerber Products Company. System and method for coating container seams. 4,110,493, Cl. 427-233.000.

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Castrodale, Daniel Owen; Lovgren, Jeffrey Lynn; Russell, Ralph Arthur; and Shidler, Karl Allen, 4,110,804, Cl. 360-118.000.

Lower, Hartmut: *See—*
Heine, Bernhard; Arndt, Wolfgang; and Lower, Hartmut, 4,110,555, Cl. 178-3.000.

Lowrance Electronics, Inc.: *See—*
Kriege, Richard P., 4,110,727, Cl. 340-10.000.

Loyd, Morris S., to Rockwell International Corporation. Composite structural joint and method of fabrication thereof. 4,109,435, Cl. 52-309.100.

Lubrizol Corporation, The: *See—*
Cohen, Jerome Martin, 4,110,349, Cl. 260-346.740.

Lubsen, Timothy Andrew: *See—*
Grubbs, Dennis Robert; Lubsen, Timothy Andrew; and Roseberry, George Leroy, Jr., 4,110,485, Cl. 426-395.000.

Luck, Werner. Polygonal body, consisting of plastics soft foam, as filling material for cushions or the like. 4,109,332, Cl. 5-337.000.

Luigi Franchi S.p.A.: *See—*
Panigoni, Giannantonio, 4,109,558, Cl. 89-191.00A.

Lukas, George N. Hydraulic booster system. 4,109,467, Cl. 60-534.000.

Luperti, Harry E.; and Manna, Robert E., to Pitney-Bowes, Inc. Means for self-positioning platen covers. 4,110,041, Cl. 355-75.000.

Luperti, Harry E.: *See—*
Irvine, Robert; Luperti, Harry E.; and Manna, Robert E., 4,110,038, Cl. 355-50.000.

Lurio, Allen: *See—*
Cairns, James Anthony; Lurio, Allen; and Ziegler, James Francis, 4,110,625, Cl. 250-492.00A.

Lussiez, Guy W.: *See—*
Hoover, Raul M.; Lussiez, Guy W.; and Reid, Hugh F., 4,110,401, Cl. 423-150.000.

Lutz, Michael. Article including an integrally molded ball and socket type hinge. 4,109,821, Cl. 220-337.000.

Lyman, Steven P., to Midas-International Corporation. Muffler assembly. 4,109,753, Cl. 181-252.000.

Lyons, James E.: *See—*
Myers, Harry K., Jr.; Lyons, James E.; and Schneider, Abraham, 4,110,409, Cl. 260-666.0PY.

M & S Industries, Inc.: *See—*
Mason, Lewis M., 4,109,328, Cl. 5-2.00R.

Maasbach, Pieter Cornelis. Method of treating plants and means to be used in this connection. 4,109,442, Cl. 53-29.000.

MacAllister, Robert V.: *See—*
Sutthoff, Robert F.; MacAllister, Robert V.; and Khaleeluddin, Khaja, 4,110,164, Cl. 195-63.000.

MacDermid Incorporated: *See*—
Grunwald, John J.; D'Ottavio, Eugene D.; Rhodenizer, Harold L.; and Lombardo, Michael S., 4,110,147, Cl. 156-306.000.
MacDonald, Carl D. Defogging device. 4,109,562, Cl. 98-2.190.
MacDonald, Rodney A.: *See*—
Nagy, Emery James; and MacDonald, Rodney A., 4,110,673, Cl. 318-466.000.
Macedo, Pedro B.; and Litovitz, Theodore A. Method for producing an impregnated waveguide. 4,110,093, Cl. 65-3.00R.
Macedo, Pedro B.; and Litovitz, Theodore A. Method of precipitation of a dopant in a porous silicate glass. 4,110,096, Cl. 65-30.00R.
Macheboeuf, Guy R.: *See*—
Mignot, Lucien F.; and Macheboeuf, Guy R., 4,110,786, Cl. 358-22.000.
Machine Technology, Inc.: *See*—
Hillman, Gary; and Devico, Michael, 4,109,337, Cl. 15-21.00D.
Madel, Andreas: *See*—
Bauer, Karl A.; Baur, Peter F.; Biedermann, Horst H.; Madel, Andreas; Nitsch, Friedrich; Pechinger, Ernst; Koenig, Walter; Ipfelkofer, Armin; Rindsfuesser, Johann J.; and Weber, Helmut, 4,109,779, Cl. 400-584.000.
Maeda, Kazuo; Noguchi, Katuichi; Kawabata, Masuo; Sato, Shigehiko; and Sato, Yukio, to Takeda Chemical Industries, Ltd. Tobacco product containing a thermo-gelable $\beta$-1,3-glucan-type polysaccharide. 4,109,663, Cl. 131-2.000.
Maeda, Shigeo: *See*—
Kurahashi, Takeo; Maeda, Shigeo; Seki, Sanai; Suzuki, Nobuo; and Sakai, Takayuki, 4,110,070, Cl. 8-2.50R.
Maganza, Dario: *See*—
Ratti, Franco; Vivarelli, Gianantonio; Maganza, Dario; and D'Amore, Emanuele, 4,109,379, Cl. 29-747.000.
Magee, Philip S., to Chevron Research Company. Insecticidal O,S-dihydrocarbyl-N-haloacylphosphoroamidothioates and S,S-dihydrocarbyl-N-haloacylphosphoroamidodithioates. 4,110,443, Cl. 424-212.000.
Mages, Bernhard: *See*—
Rock, Erich; and Mages, Bernhard, 4,109,344, Cl. 16-144.000.
Magna International Inc.: *See*—
Harding, Dukecal Jenner, 4,110,195, Cl. 208-11.0LE.
Magnavox Company, The: *See*—
Richeson, William E., Jr.; and Kray, Gerald L., 4,109,630, Cl. 123-148.00E.
Magnusson, Alan B.: *See*—
Dieck, Ronald L.; and Magnusson, Alan B., 4,110,421, Cl. 423-300.000.
Magyar, Joseph J., to General Motors Corporation. Anchorage system for a seat belt. 4,109,962, Cl. 297-385.000.
Maisonneuve, Leo V. Container and dispensing package. 4,109,826, Cl. 221-72.000.
Makhteshim Chemical Works Ltd.: *See*—
Aelony, David; and Vofsi, David, 4,110,379, Cl. 260-584.00R.
Makino, Hiroshi: *See*—
Shinohara, Shigeyuki; and Makino, Hiroshi, 4,109,548, Cl. 74-569.000.
Malacheski, Joseph J. Coin counter. 4,109,668, Cl. 133-8.00R.
Mallinckrodt, Inc.: *See*—
Margherita, Salvatore S., 4,110,076, Cl. 23-230.600.
Sheridan, David S., 4,109,659, Cl. 128-349.00R.
Mallory, Henry Rodgers: *See*—
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Malpass, Dennis B.: *See*—
Watson, Spencer C.; Malpass, Dennis B.; and Yeargin, G. Scott, 4,110,357, Cl. 260-448.00A.
Maly, Hans-Peter, to Robert Bosch GmbH. Process and apparatus for the exact determination of the periodic position of a television vertical synchronizing signal. 4,110,789, Cl. 358-148.000.
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Mitchell, James A. H.; and Day, Edward J., to Mitchell Beazley Encyclopedias, Ltd. System for arranging and retrieving information. 4,109,938, Cl. 283-43.000.
Mitchell, Kenneth J.; and Ostermeier, Kurt W., to Kimberly-Clark Corporation. Apparatus for forming nonwoven web. 4,109,353, Cl. 28-104.000.
Mitchell, Robert C. Rod and reel storage apparatus. 4,109,796, Cl. 211-60.00R.
Mitsubishi Chemical Industries Limited: *See*—
Miyajima, Tohru, 4,110,520, Cl. 526-27.000.
Mitsubishi Denki Kabushiki Kaisha: *See*—
Akamatsu, Masahiko, 4,110,669, Cl. 318175-.
Shibata, Hiroshi; and Yoshihara, Tsutomu, 4,109,371, Cl. 29-571.000.
Mitsubishi Gas Chemical Company, Inc.: *See*—
Gaku, Morio; Suzuki, Kazuhiro; and Nakamichi, Kazuyuki, 4,110,364, Cl. 528-170.000.
Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
Hashimoto, Hiroshi; and Kimura, Kyozo, 4,109,621, Cl. 123-65.0SP.
Okamoto, Jiro; Hirose, Mamoru; Miyamoto, Katsuji; and Kuroki, Shinichiro, 4,110,596, Cl. 219-124.400.
Mitsubishi Kinzoku Kabushiki Kaisha: *See*—
Kondo, Tatsuo; Shindo, Masami; Ohmura, Taizo; Yonezawa, Noboru; Kawagoe, Akira; and Kojima, Toshio, 4,110,110, Cl. 75-122.000.
Mitsubishi Pencil Co. Ltd.: *See*—
Hida, Hiroyuki, 4,109,398, Cl. 35-13.000.
Mitsudo, Hiroyuki; and Yoshida, Masazumi, to New Cosmos Electric Company Limited. Spark-plug for automobile internal combustion engine. 4,109,633, Cl. 123-169.0EL.
Mitsui, Shigeo: *See*—
Uchida, Tsutomu; Ono, Zenichi; Nagashima, Makoto; Tasaka, Eiji; Mitsui, Shigeo; and Nomura, Keiichi, 4,109,801, Cl. 214-6.0FS.
Mitsui Toatsu Chemicals Inc.: *See*—
Inoue, Shigeru, 4,110,374, Cl. 260-555.00A.
Mitter, Mathias. Apparatus for printing webs. 4,109,483, Cl. 68-200.000.

Miura, Mitsutoshi: *See*—
Suzuki, Gyoichi; Moriguchi, Sanseki; Miyazu, Takashi; Okuyama, Yasuo; Muroya, Masahiro; Yanagiuchi, Mamoru; Mori, Takashi; and Miura, Mitsutoshi, 4,110,169, Cl. 201-6.000.

Miyajima, Tohru, to Kyoritsu Yuki Co., Ltd.; and Mitsubishi Chemical Industries Limited. Modification of water-soluble acrylic polymer. 4,110,520, Cl. 526-27.000.

Miyake, Hajimu: *See*—
Hayashi, Masaki; Kori, Seiji; and Miyake, Hajimu, 4,110,341, Cl. 260-327.00C.

Miyamoto, Katsuji: *See*—
Okamoto, Jiro; Hirose, Mamoru; Miyamoto, Katsuji; and Kuroki, Shinichiro, 4,110,596, Cl. 219-124.400.

Miyamoto, Noriaki: *See*—
Kobayashi, Akira; Chiba, Kunji; Miyamoto, Noriaki; Shiraki, Masao; and Furukawa, Naotake, 4,109,452, Cl. 57-58.890.
Kobayashi, Akira; Chiba, Kunji; Miyamoto, Noriaki; Shiraki, Masao; and Furukawa, Naotake, 4,109,453, Cl. 57-58.910.

Miyao, Hiroyasu, to Yamaha Hatsudoki Kabushiki Kaisha. Ignition systems of internal combustion engines. 4,109,631, Cl. 123-148.0CA.

Miyata, Katsuhiko; Urano, Fumio; and Arai, Akihiro, to Asahi Kogaku Kogyo Kabushiki Kaisha. Light-measuring systems for single lens reflex cameras. 4,110,765, Cl. 354-59.000.

Miyazaki, Togo; and Shimizu, Masatoshi, to Nippon Electric Company, Ltd. Plasma display panel driving circuit including apparatus for producing high frequency pulses without the use of clock pulses. 4,110,663, Cl. 315-169.0TV.

Miyazato, Teruhiko. Puncture-proof tubeless tires. 4,109,695, Cl. 152-347.000.

Miyazu, Takashi: *See*—
Suzuki, Gyoichi; Moriguchi, Sanseki; Miyazu, Takashi; Okuyama, Yasuo; Muroya, Masahiro; Yanagiuchi, Mamoru; Mori, Takashi; and Miura, Mitsutoshi, 4,110,169, Cl. 201-6.000.

Mobil Oil Corporation: *See*—
McLeod, Gordon D., 4,110,117, Cl. 106-1.170.
Schwab, Frederick C.; Sheppard, Edward W.; and Chen, Catherine S. H., 4,110,232, Cl. 252-8.55B.
Slusser, Marion L., 4,109,721, Cl. 166-280.000.

Mochizuki, Kiyoshi: *See*—
Shimada, Teizo; Kita, Takeshi; Mochizuki, Kiyoshi; and Komiya, Takahiro, 4,110,394, Cl. 264-167.000.

Moed, Johannes A. R., to TRW Inc. Service generator for generating a plurality of tones. 4,110,562, Cl. 179-15.0BY.

Moeller, Carl A., Jr., to Flexothane Corporation. Clampable plastic gear and the like. 4,110,054, Cl. 403-373.000.

Moga, Antonio Carmelo Marin: *See*—
Barra, Emilia Francia; and Moga, Antonio Carmelo Marin, 4,110,442, Cl. 424-212.000.

Mohr, Adolf: *See*—
Odor, Frank; Mohr, Adolf; and Bolenz, Klaus, 4,110,718, Cl. 335-296.000.

Molina, Orlando G., to Rockwell International Corporation. Nondestructive magnetic recording medium. 4,110,236, Cl. 252-62.540.

Mollet, Hans; and Rehmann, Wolfgang, to Ciba-Geigy. Fluid and stable dispersions of anionic dyestuffs. 4,110,073, Cl. 8-85.00R.

Mollgaard, Klaus; Keller, Hans; Sendtko, Ulrich; and Sommer, Rudiger, to Dr. -Ing. Rudolf Hell GmbH. Apparatus and process for color-identification. 4,110,826, Cl. 364-526.000.

Momonoi, Kaishu: *See*—
Saikawa, Isamu; Takano, Shuntaro; Yoshida, Chosaku; Takashima, Okuta; Momonoi, Kaishu; Kuroda, Seietsu; Komatsu, Miwako; Yasuda, Takashi; and Kodama, Yutaka, 4,110,327, Cl. 544-385.000.

Monier Colourtile Pty. Ltd.: *See*—
Aarons, Raymond Joseph, 4,109,428, Cl. 52-94.000.

Monitoring Systems, Inc.: *See*—
Bailey, John M., 4,110,688, Cl. 324-208.000.

Monsanto Company: *See*—
Drummond, James C.; and Hughes, Lawrence J., 4,110,542, Cl. 568-729.000.
Franz, John E.; and Sacher, Reuven M., 4,110,100, Cl. 71-86.000.

Montabert, Roger. Percussion machine. 4,109,734, Cl. 173-114.000.

Montague, John M.: *See*—
Files, James H.; Montague, John M.; and Thomerson, Clarence T., 4,109,474, Cl. 61-48.000.

Monte, Anthony J.: *See*—
Arutunian, Gregory; and Monte, Anthony J., 4,110,812, Cl. 361-248.000.

Montedison S.p.A.: *See*—
Bornengo, Mario, 4,110,405, Cl. 260-646.000.

Monzain, Michel. Package lifter. 4,109,952, Cl. 294-16.000.

Moogalian, Charles M.: *See*—
Norman, Vello; and Moogalian, Charles M., 4,109,666, Cl. 131-261.00B.

Moons, Hugo, to Alvey, Inc. Device for rotating by 90° the movement direction of pallets and similar between two conveying tracks. 4,109,781, Cl. 198-485.000.

Moore, Boyd B.; and Kendall, Clarence E., Jr., to Custom Cable Company. Buoyant tether cable. 4,110,554, Cl. 174-101.500.

Moore, Edward Joseph; and Owens, John Edward, to Du Pont de Nemours, E. I., and Company. Static charge neutralizer and process. 4,110,810, Cl. 361-213.000.

Moore, James O., to Moore Products Co. Control circuit for bar graph display panel. 4,110,665, Cl. 315-169.0TV.

Moore Products Co.: *See*—
Moore, James O., 4,110,665, Cl. 315-169.0TV.

Moraveck, James F., to Olin Corporation. Urethane coating composition and process. 4,110,317, Cl. 528-77.000.

Moreau, Robert D.: *See*—
Haas, Howard C.; and Moreau, Robert D., 4,110,424, Cl. 423-365.000.

Morgan, David W.: *See*—
Britton, James S.; and Morgan, David W., 4,110,814, Cl. 361-371.000.

Morgan, Kenneth A.: *See*—
Selvidge, Charles W.; Morgan, Kenneth A.; and Frame, Robert R., 4,110,398, Cl. 423-62.000.

Morge, Michael P.: *See*—
Adams, Stanley B.; and Morge, Michael P., 4,109,812, Cl. 214-762.000.

Mori, Masatoshi; and Fukata, Ryoji, to Toyo Ink Manufacturing Co., Ltd. Pressure-sensitive adhesives. 4,110,290, Cl. 260-29.6RW.

Mori, Shigeru; Ohsawa, Shigeyoshi; Aoki, Hatsuo; and Imanaka, Hiroshi, to Fujisawa Pharmaceutical Co., Ltd. Process for the production of nocardicin A. 4,110,166, Cl. 195-96.000.

Mori, Takashi: *See*—
Suzuki, Gyoichi; Moriguchi, Sanseki; Miyazu, Takashi; Okuyama, Yasuo; Muroya, Masahiro; Yanagiuchi, Mamoru; Mori, Takashi; and Miura, Mitsutoshi, 4,110,169, Cl. 201-6.000.

Moriguchi, Sanseki: *See*—
Suzuki, Gyoichi; Moriguchi, Sanseki; Miyazu, Takashi; Okuyama, Yasuo; Muroya, Masahiro; Yanagiuchi, Mamoru; Mori, Takashi; and Miura, Mitsutoshi, 4,110,169, Cl. 201-6.000.

Morinaga & Co., Ltd.: *See*—
Sato, Fumio, 4,110,482, Cl. 426-497.000.

Morohoshi, Hideo: *See*—
Katada, Michihisa; Hayashi, Katsutake; Katsura, Hakuji; Tomita, Kenichi; Morohoshi, Hideo; Uehara, Keiichi; and Tanaka, Hiroshi, 4,110,626, Cl. 252-522.000.

Morrill, Charles Donovan, to McEvoy Oilfield Equipment Company. Seal. 4,109,942, Cl. 285-140.000.

Morris, George O., to Offenhauser, Fred C., a part interest. Flow control insert for internal combustion engine intake manifolds. 4,109,619, Cl. 123-52.00R.

Morris, Matthew Gerald, Jr.: *See*—
Gorgens, Joseph E.; and Morris, Matthew Gerald, Jr., 4,109,537, Cl. 73-756.000.

Morris, Ronald George, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Microstrip circuit having coplanar waveguide port. 4,110,712, Cl. 333-33.000.

Morse, Donald B., to Kemlite Corporation. Apparatus for the preparation of resin impregnated glass fiber sheets. 4,110,151, Cl. 156-519.000.

Mortensen, Marvin L.: *See*—
Wight, Hewitt G.; Call, Tracey G.; and Mortensen, Marvin L., 4,110,444, Cl. 424-226.000.

Moser, Fernand, to Moser, Louis. Liquid filtration device. 4,110,221, Cl. 210-481.000.

Moser, Louis: *See*—
Moser, Fernand, 4,110,221, Cl. 210-481.000.

Moser, Robert E.; Powers, Larry J.; and Ariyan, Zaven S., to Diamond Shamrock Corporation. Antiinflammatory imidazothiazoles and thiazolopyrimidines. 4,110,451, Cl. 424-251.000.

Moses, Manfred. System for the utilization of waste heat from a boiler room to heat a fluid medium and lower the ambient temperature of a boiler room. 4,109,858, Cl. 237-8.00R.

Moss, Barry: *See*—
Gurwicz, David; Sloan, Albert Everett; Moss, Barry; Wild, Arthur; and Ord, William Robert, 4,110,668, Cl. 318-78.000.

Motobayashi, Kozo: *See*—
Yamada, Yasuo; Kamiya, Kazuo; Katayama, Iwao; Motobayashi, Kozo; and Yonemura, Yoshiaki, 4,109,451, Cl. 57-56.000.

Motorola Inc.: *See*—
Abe, Kichio; and Martino, William L., Jr., 4,110,840, Cl. 365-203.000.
Bethards, Charles William, 4,110,699, Cl. 328-168.000.
Irwin, James Stuart; and Gilmore, Merle Lee, 4,110,704, Cl. 331-113.00R.

Motsinger, Donald L., to PPG Industries, Inc. Method of forming glass fiber. 4,110,094, Cl. 65-3.00C.

Mouissie, Bob, to Du Pont de Nemours, E. I., and Company. Electrical connector and contact. 4,109,986, Cl. 339-17.00L.

Mueller-Tamm, Heinz: *See*—
Frielingsdorf, Hans; Gruber, Wolfgang; and Mueller-Tamm, Heinz, 4,110,522, Cl. 526-105.000.
Schweier, Guenther; Kolk, Erich; Mueller-Tamm, Heinz; Frielingsdorf, Hans; Bachl, Robert; and Gruber, Wolfgang, 4,110,523, Cl. 526-124.000.

Mueller, William L.; and Winkel, Robert J., to Candid Logic, Inc. Digital electrical position transducer. 4,110,610, Cl. 250-231.0SE.

Mueller, William L.: *See*—
Tann, Lewis H.; Mueller, William L.; and Vis, Arthur D., 4,110,611, Cl. 250-237.00R.

Mulder, Rudolf: *See*—
Wellinga, Kobus; and Mulder, Rudolf, 4,110,469, Cl. 424-304.000.

Muller, Arnold. Induction motor. 4,110,643, Cl. 310-54.000.

Muller, Hans. Apparatus with foam breaker. 4,110,089, Cl. 55-178.000.

Muller, Helmut: *See*—
Gilg, Bernard; Muller, Helmut; and Rody, Jean, 4,110,304, Cl. 260-45.80N.

Mullisen, Ronald S.: *See*—
Keech, Roger A., 4,109,466, Cl. 60-487.000.
Munn, Leo Arnold. Skyline logging carriage. 4,109,799, Cl. 212-83.000.
Muraki, Hideaki: *See*—
Fujitani, Yoshiyasu; and Muraki, Hideaki, 4,109,461, Cl. 60-274.000.
Murano, Minoru; Yanabu, Satoru; Tamagawa, Tohoru; and Ikeda, Hisatoshi, to Tokyo Shibaura Denki Kabushiki Kaisha. Circuit interrupting apparatus for use in direct current circuits. 4,110,806, Cl. 361-4.000.
Murayama, Yoshinobu, to Kubota Ltd. Stepless speed change systems. 4,109,550, Cl. 74-691.000.
Muroya, Masahiro: *See*—
Suzuki, Gyoichi; Moriguchi, Sanseki; Miyazu, Takashi; Okuyama, Yasuo; Muroya, Masahiro; Yanagiuchi, Mamoru; Mori, Takashi; and Miura, Mitsutoshi, 4,110,169, Cl. 201-6.000.
Murphy, Philip Joseph, to Lancaster Colony Corporation. Floating illuminating device. 4,110,066, Cl. 431-320.000.
Musgrave, Daniel Dennis. Magazine contents indicators. 4,109,401, Cl. 42-50.000.
Muukka, Esko: *See*—
Kolmonen, Kalle; and Muukka, Esko, 4,109,758, Cl. 184-15.00A.
Myers, Harry K., Jr.; Lyons, James E.; and Schneider, Abraham, to Suntech, Inc. Process for making codimers of norbornadiene and alkynes using a cobalt catalyst. 4,110,409, Cl. 260-666.0PY.
Myers, Ted L.: *See*—
Easter, Holton C.; Matrinetz, Frank F.; and Myers, Ted L., 4,109,972, Cl. 308-3.00R.
Mykietyn, Edward: *See*—
Rosen, Arye; and Mykietyn, Edward, 4,110,700, Cl. 329-103.000.
Nadella: *See*—
Stephan, Gerard, 4,109,977, Cl. 308-174.000.
Nadkarni, Anil Vasant, to SCM Corporation. Forging powdered dispersion strengthened metal. 4,110,130, Cl. 148-11.50P.
Nagamine, Takashi: *See*—
Koshiga, Fusao; Tanaka, Jinkichi; Watanabe, Itaru; Suzuki, Motoaki; Kojima, Toshifumi; Matsubara, Hiroyoshi; Osuka, Tatsumi; Takeshige, Kenji; Nagamine, Takashi; and Hirano, Osamu, 4,110,589, Cl. 219-66.000.
Nagashima, Makoto: *See*—
Uchida, Tsutomu; Ono, Zenichi; Nagashima, Makoto; Tasaka, Eiji; Mitsui, Shigeo; and Nomura, Keiichi, 4,109,801, Cl. 214-6.0FS.
Nagata, Shigeaki: *See*—
Kiyono, Yutaka; Nagata, Shigeaki; Shigemori, Shuichiro; Kishimoto, Tadashi; Maruyama, Sadao; and Arisawa, Katsuyoshi, 4,109,999, Cl. 350-91.000.
Nagy, Emery James; and MacDonald, Rodney A., to Kwikee Enterprises, Inc. Extendable vehicle step and step motor control system. 4,110,673, Cl. 318-466.000.
Nakagawa, Tadashi; Koyama, Mitsuo; and Onda, Eiichi, to Seiko Koki Kabushiki Kaisha. Camera shutter having bound prevention device. 4,110,772, Cl. 354-246.000.
Nakai, Isao, to Rain Kogyo Kabushiki Kaisha. Accumulating roller conveyor. 4,109,782, Cl. 198-781.000.
Nakai, Masanori: *See*—
Tokumaru, Yukuya; and Nakai, Masanori, 4,110,634, Cl. 307-213.000.
Nakamichi, Kazuyuki: *See*—
Gaku, Morio; Suzuki, Kazuhiro; and Nakamichi, Kazuyuki, 4,110,364, Cl. 528-170.000.
Nakamura, Gichi. Continuous sewage sludge heat treatment apparatus. 4,110,217, Cl. 210-175.000.
Nakamura, Kensaku. Vent type extruder. 4,110,844, Cl. 366-76.000.
Nakamura, Matsuaki: *See*—
Ogawa, Hiroshi; Aonuma, Masashi; Nakamura, Matsuaki; and Tamai, Yasuo, 4,110,503, Cl. 428-64.000.
Nakamura, Norihiko: *See*—
Konishi, Masami; Nakamura, Norihiko; Itou, Takaaki; and Kikuchi, Kazuo, 4,110,417, Cl. 261-39.00A.
Nakanishi, Mutsuo; and Schmidt, Hans, to Quasar Electronics Corporation. Adjustable potentiometer assembly. 4,110,721, Cl. 338-128.000.
Nakano, Kenichi: *See*—
Eden, Richard C.; and Nakano, Kenichi, 4,110,778, Cl. 357-30.000.
Nakasaki, Eiji; and Shirashoji, Hishashi, to Sumitomo Rubber Industries, Ltd. Pneumatic tire for motorcycle. 4,109,696, Cl. 152-354.00R.
Nakatsukasa, Walter M.; and Hamill, Robert L., to Eli Lilly and Company. Antibiotic A-28086 factor D and process for production thereof. 4,110,435, Cl. 424-122.000.
Nakatsukasa, Walter M.; and Hamill, Robert L., to Eli Lilly and Company. Antibiotic A-28086 factor D and process for production thereof. 4,110,436, Cl. 424-122.000.
Namikawa, Mamoru: *See*—
Hoshino, Yasushi; and Namikawa, Mamoru, 4,110,797, Cl. 360-17.000.
Nandyal, Srinath; and McNally, Sellers B., to Maremont Corporation. Compression head assembly. 4,109,767, Cl. 188-315.000.
Naphtachimie Societe Anonyme: *See*—
Sandis, Stylianos; and Bailly, Jean Claude, 4,110,248, Cl. 252-429.00B.
Narad, Inc.: *See*—
Jansen, Bernard George, Jr., 4,109,587, Cl. 105-490.000.
Narayan, Thirumurti, to BASF Wyandotte Corporation. Process for the preparation of foams characterized by isocyanurate and urethane linkages. 4,110,270, Cl. 521-121.000.
Naruchi, Tatuyuki: *See*—
Ichikawa, Yataro; Kobayashi, Osamu; Soma, Kazuhiko; Naruchi, Tatuyuki; Yamanaka, Yoshiyuki; and Suzuki, Nobuo, 4,110,403, Cl. 260-603.00R.
Naruse, Kintaro; and Naruse, Wataru, to Kabushiki Kaisha Naruse Fermentation Laboratory. Method for producing natto containing lactic acid bacteria. 4,110,477, Cl. 426-46.000.
Naruse, Wataru: *See*—
Naruse, Kintaro; and Naruse, Wataru, 4,110,477, Cl. 426-46.000.
National Research Development Corporation: *See*—
Baker, Lionel Richard; and Wojtowicz, Tadeusz, 4,110,046, Cl. 356-124.000.
Hawkes, Peter Louis, 4,110,556, Cl. 178-19.000.
Larke, John Reginald; Barber, Colin; and Cotterill, David John, 4,109,648, Cl. 128-2.06E.
National Semiconductor Corporation: *See*—
Nelson, Carl T.; and Hollins, Brian E., 4,110,782, Cl. 357-48.000.
NCO Works Ltd.: *See*—
Mashida, Toru; Matsushita, Sumeo; and Ikegami, Iwao, 4,110,139, Cl. 156-79.000.
NCR Corporation: *See*—
Bauer, Karl A.; Baur, Peter F.; Biedermann, Horst H.; Madel, Andreas; Nitsch, Friedrich; Pechinger, Ernst; Koenig, Walter; Ipfelkofer, Armin; Rindsfuesser, Johann J.; and Weber, Helmut, 4,109,779, Cl. 400-584.000.
Gottschlich, James A., 4,109,790, Cl. 206-446.000.
Neal, John A., to Georgia-Pacific Corporation. Clarification process. 4,110,208, Cl. 210-425.000.
Ned Strongin Associates, Inc.: *See*—
Wetherell, Joseph J.; Fogarty, A. Edward; and Fogarty, Bonnie Rose, 4,109,411, Cl. 46-79.000.
Neefe, Charles W. Permeable polymethylmethacrylate contact lens. 4,110,264, Cl. 521-63.000.
Neel, Jean: *See*—
Violland, Robert; and Neel, Jean, 4,110,284, Cl. 260-29.2TN.
Neidigh, Robert J., to Wheelabrator-Frye Inc. Recirculating shot testing device. 4,109,507, Cl. 73-12.000.
Nelson, Alfred N.; and Davis, David L., to Addressograph Multigraph Corporation. High quality printing system with constant intermittent tape drive. 4,110,758, Cl. 346-74.100.
Nelson, Carl T.; and Hollins, Brian E., to National Semiconductor Corporation. Monolithic integrated circuit transistor having very low collector resistance. 4,110,782, Cl. 357-48.000.
Nelson, Donald L.; and Herbert, Norman T., to Dow Chemical Company, The. High temperature polymers from methoxy functional ether aromatic monomers. 4,110,279, Cl. 260-19.00R.
Nelson, Marshall A.: *See*—
Dunning, Richard E.; and Nelson, Marshall A., 4,110,152, Cl. 156-553.000.
Nelson, Norman A., to Upjohn Company, The. 2-Decarboxy-2-hydroxy-methyl-3,7-inter-m-phenylene-ω-phenoxy-PGF$_1$ compounds. 4,110,381, Cl. 260-590.00C.
Nelson, Norman A., to Upjohn Company, The. 2-Decarboxy-2-hydroxy-methyl-ω-phenyl-PGE analogs. 4,110,382, Cl. 260-590.00C.
Nelson, Norman A., to Upjohn Company, The. 2-Decarboxy-2-hydroxymethyl-3-7-inter-m-phenylene-w-phenyl-PGA$_1$ or 9-deoxy-9,10-didehydro-PGD$_1$ compounds. 4,110,383, Cl. 260-590.00C.
Nelson, Norman A., to Upjohn Company, The. 2-Decarboxy-2-hydroxymethyl-5-oxa-ωphenoxy-PGA$_1$ or 9-deoxy-9,10-didehydro-PGD$_1$compounds. 4,110,384, Cl. 260-590.00C.
Nemcek, Jozef: *See*—
Dart, Edward Charles; Cantwell, John Burnett; Traynor, James Rodney; Jaworzyn, Joseph Franciszek; and Nemcek, Jozef, 4,110,184, Cl. 204-159.230.
Nemec, Allen R. Variable speed gear ratio transmission apparatus. 4,109,551, Cl. 74-705.000.
Nemoto, Ichiro: *See*—
Onda, Eiichi; Koyama, Mitsuo; Nemoto, Ichiro; Nokagawa, Tadashi; and Watanabe, Masanori, 4,110,767, Cl. 354-152.000.
Neri, Filippo, to Selenia-Industrie Elettroniche Associate S.p.A. Systems for reducing the elevation error for tracking radars of low height targets. 4,110,752, Cl. 343-7.400.
Nesmeyanov, Anatoly Alexandrovich: *See*—
Nesmeyanov, Nikolai Alexandrovich; Nesmeyanov, Ivan Alexandrovich; and Nesmeyanov, Anatoly Alexandrovich, 4,109,660, Cl. 128-419.00R.
Nesmeyanov, Ivan Alexandrovich: *See*—
Nesmeyanov, Nikolai Alexandrovich; Nesmeyanov, Ivan Alexandrovich; and Nesmeyanov, Anatoly Alexandrovich, 4,109,660, Cl. 128-419.00R.
Nesmeyanov, Nikolai Alexandrovich; Nesmeyanov, Ivan Alexandrovich; and Nesmeyanov, Anatoly Alexandrovich. Method of tooth anesthetizing during dental treatment and device for effecting same. 4,109,660, Cl. 128-419.00R.
Neste Oy: *See*—
Roman, Alain; Sachetto, Jean-Pierre; Wust, Manfred; and Cuccolo, Sergio, 4,110,112, Cl. 96-1.0PC.
Neuhouser, Donald Eugene, to Harvey Hubbell, Incorporated. Continuity monitoring system. 4,110,807, Cl. 361-42.000.
New Cosmos Electric Company Limited: *See*—
Mitsudo, Hiroyuki; and Yoshida, Masazumi, 4,109,633, Cl. 123-169.0EL.
Newkirk, David Dudley; Login, Robert Bernard; and Thir, Basil, to BASF Wyandotte Corporation. Oxidation stable polyoxyalkylene fiber lubricants. 4,110,227, Cl. 252-8.900.
Newland, John W., to W & F Mfg. Co., Inc. Fragrance-emitting article

having a polymer-petroleum wax composition. 4,110,261, Cl. 252-522.000.
Newnham, Robert E.: *See—*
Cross, Leslie E.; and Newnham, Robert E., 4,109,359, Cl. 29-25.350.
Newroyd Limited: *See—*
Barnes, William John; Belcher, Barry John; and Harvey, John Kenneth, 4,109,593, Cl. 112-79.00A.
Newson, John Chase; Tregoning, Geoffrey Robinson; and Digby, James Baden, to Westinghouse Brake & Signal Co. Ltd. Vehicle door arrangements. 4,109,416, Cl. 49-316.000.
Nicholson, Frederick, to Elektriska Svetsningsaktiebolaget. Weld metal deposit coated tool steel. 4,110,514, Cl. 428-683.000.
Nicolson, John Millar: *See—*
Eslinger, Ralph Gilbert; and Nicolson, John Millar, 4,110,647, Cl. 310-168.000.
Nidola, Antonio; De Nora, Vittorio; and Spaziante, Placido M., to Diamond Shamrock Technologies S.A. Process for electrolysis of bromide containing electrolytes. 4,110,180, Cl. 204-128.000.
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Hayashi, Yukichi, 4,109,774, Cl. 194-1.00C.
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Nippon Columbia Kabushikikaisha: *See—*
Araki, Tetsuro; and Hayashi, Hideaki, 4,110,670, Cl. 318-212.000.
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Matsumoto, Youichi; Tagashira, Yoshimi; and Yokoyama, Seijiro, 4,110,706, Cl. 332-19.000.
Miyazaki, Togo; and Shimizu, Masatoshi, 4,110,663, Cl. 315-169.0TV.
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Ninomiya, Yuichi, 4,110,745, Cl. 340-347.0AD.
Nippon Kokan Kabushiki Kaisha: *See—*
Koshiga, Fusao; Tanaka, Jinkichi; Watanabe, Itaru; Suzuki, Motoaki; Kojima, Toshifumi; Matsubara, Hiroyoshi; Osuka, Tatsumi; Takeshige, Kenji; Nagamine, Takashi; and Hirano, Osamu, 4,110,589, Cl. 219-66.000.
Kunioka, Kazuo; Noguchi, Takao; and Sato, Hiroaki, 4,110,092, Cl. 62-64.000.
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Akita, Sigeyuki; and Kitagawa, Junji, 4,110,740, Cl. 340-620.000.
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Takeuchi, Yukihisa; and Wakayama, Masao, 4,110,256, Cl. 252-465.000.
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Fukuyama, Masaru, 4,109,508, Cl. 73-15.0FD.
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Aono, Shigeo; and Anzai, Makoto, 4,109,626, Cl. 123-139.0AW.
Asano, Masaharu, 4,109,615, Cl. 123-32.0EE.
Endo, Hiroshi, 4,110,754, Cl. 343-16.00R.
Ishikawa, Masao, 4,110,819, Cl. 362-40.000.
Washio, Masayuki; and Harada, Tetsuya, 4,109,624, Cl. 123-119.00A.
Nitsch, Friedrich: *See—*
Bauer, Karl A.; Baur, Peter F.; Biedermann, Horst H.; Madel, Andreas; Nitsch, Friedrich; Pechinger, Ernst; Koenig, Walter; Ipfelkofer, Armin; Rindsfuesser, Johann J.; and Weber, Helmut, 4,109,779, Cl. 400-584.000.
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Nolley, John P., Jr., to UOP Inc. Sulfur dioxide removal by absorption and fractionation. 4,110,087, Cl. 55-73.000.
Nomura, Hiroaki: *See—*
Minami, Isao; Yoshioka, Yoshio; and Nomura, Hiroaki, 4,110,537, Cl. 544-313.000.
Nomura, Junichi; and Kanai, Masashi. Hand craft yarn art materials and structure and methods of manufacture and use thereof. 4,110,138, Cl. 156-63.000.
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Noone, Michael J., to General Electric Company. Thermally conductive ceramic attachment. 4,109,706, Cl. 165-32.000.
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Allemann, James G., 4,109,494, Cl. 70-107.000.
Allemann, James G.; and Grey, Michael W., 4,109,496, Cl. 70-380.000.
Dietrich, Hagen, 4,109,498, Cl. 70-449.000.
Potter, Dennis G.; Dietrich, Hagen; and Potschka, Joseph, 4,109,948, Cl. 292-169.150.
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Northwest Engineering Company: *See—*
Strong, Richard I., 4,109,771, Cl. 192-83.000.
Noshiro, Makoto: *See—*
Abe, Takeshi; Ichimura, Masahiko; Noshiro, Makoto; Kunii, Nobuaki; and Ito, Yasumichi, 4,110,308, Cl. 260-45.75C.
Novello, Frederick C.: *See—*
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Nudenberg, Walter: *See—*
Loveless, Frederick C.; and Nudenberg, Walter, 4,110,234, Cl. 252-47.500.
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van Beveren, Marius; and Nuhoff, Peerke Jan, 4,109,856, Cl. 235-308.000.
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Numbers, Jody L., to Sickles, Ralph A.; and Sickles, Doris E., Co-Trustees of the Ralph A. Sickles Family Estate. Micro fiche indexer. 4,110,021, Cl. 353-27.00R.
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Baumann, Hans; and Oberlinner, Andreas, 4,110,348, Cl. 260-345.200.
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Burton, Robert S., III, 4,109,718, Cl. 166-256.000.
Ridley, Richard D., 4,109,964, Cl. 299-2.000.
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Ophey, Petrus J. M., 4,110,033, Cl. 355-14.000.
Wittenberg, Albert Jan; and van der Velden, Guido J. M., 4,110,040, Cl. 355-70.000.
Oda, Yasuhiro: *See—*
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Vollmer, Helmut; Udert, Karl Ernst; and Oechsle, Hans, 4,109,556, Cl. 85-84.000.
Oelke, Waldemar W.; Boehm, Hans W.; and Herrington, Richard A., to Libbey-Owens-Ford Company. Method of and apparatus for thermally severing glass. 4,109,840, Cl. 225-2.000.
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Morris, George O., 4,109,619, Cl. 123-52.00R.
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Kondo, Tatsuo; Shindo, Masami; Ohmura, Taizo; Yonezawa, Noboru; Kawagoe, Akira; and Kojima, Toshio, 4,110,110, Cl. 75-122.000.
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Mori, Shigeru; Ohsawa, Shigeyoshi; Aoki, Hatsuo; and Imanaka, Hiroshi, 4,110,166, Cl. 195-96.000.
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Hayashi, Kiyozumi; Ohta, Takeo; and Kobori, Tetsuo, 4,110,160, Cl. 176-78.000.
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Oita, Katashi, to Weyerhaeuser Company. Wet weather resistant binder composition for adhering a plant treatment additive powder formulation to plant foliage. 4,110,431, Cl. 424-78.000.
Okamoto, Jiro; Hirose, Mamoru; Miyamoto, Katsuji; and Kuroki, Shinichiro, to Mitsubishi Jukogyo Kabushiki Kaisha. Apparatus for transporting and collecting self-propelled welding carriages. 4,110,596, Cl. 219-124.400.
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Suzuki, Gyoichi; Moriguchi, Sanseki; Miyazu, Takashi; Okuyama, Yasuo; Muroya, Masahiro; Yanagiuchi, Mamoru; Mori, Takashi; and Miura, Mitsutoshi, 4,110,169, Cl. 201-6.000.
Olander, Walter Karl: *See*—
Banucci, Eugene George; and Olander, Walter Karl, 4,110,312, Cl. 528-215.000.
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Ehrenfruend, Herbert A., 4,110,269, Cl. 521-81.000.
Olin, Arthur D.: *See*—
Fitzpatrick, Joseph W.; and Olin, Arthur D., 4,110,072, Cl. 8-25.000.
Olin Corporation: *See*—
Chesler, Edwin T.; Goodman, Donald; and Lapkin, Milton, 4,110,527, Cl. 526-235.000.
Kleine, Charles A.; and Middleton, Verne L., 4,109,711, Cl. 165-170.000.
Moraveck, James F., 4,110,317, Cl. 528-77.000.
Parikh, Prakash D.; and Shapiro, Eugene, 4,110,132, Cl. 148-32.000.
Specht, Steven J.; and Adams, John O., 4,110,191, Cl. 204-266.000.
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Olson, Ernest E. Duplex outlet device. 4,109,988, Cl. 339-91.00R.
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Olszewski, Jerzy A.; and Sarkar, Arnab, to General Cable Corporation. Optical fiber cable construction. 4,110,001, Cl. 350-96.230.
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Ikeda, Yoshitsugi, 4,110,007, Cl. 350-215.000.
Konoshima, Katunaga, 4,110,820, Cl. 362-207.000.
Omori, Mamoru: *See*—
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O'Neil, Walter K.: *See*—
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Hayashi, Masaki; Kori, Seiji; and Miyake, Hajimu, 4,110,341, Cl. 260-327.00C.
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Yoshida, Yoshiaki; Suzuki, Osamu; and Onoue, Keizi, 4,109,450, Cl. 57-34.00R.
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Opcon Associates of Canada, Ltd.: *See*—
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Opsvik, Peter, to Stokke Fabrikker A/S. Adjustable chair. 4,109,961, Cl. 297-338.000.
Ora, Alpo, to Rauma-Repola OY. Method for making a soluble sulfite additive for use in a pulp making process. 4,110,154, Cl. 162-36.000.
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Gante, Joachim; Kurmeier, Hans-Adolf; Schacht, Erich; Mehrhof, Werner; Orth, Dieter; Wild, Albrecht; and Simane, Zdenek, 4,110,447, Cl. 424-244.000.
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Hubert, Jacques; Ory, Jean-Marie; Bottin, Jean; and Humbert, Claude, 4,110,741, Cl. 340-573.000.
Osawa, Masayuki, to TDK Electronics Co., Ltd. Cassette tape winding apparatus. 4,109,878, Cl. 242-68.300.
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Mitchell, Kenneth J.; and Ostermeier, Kurt W., 4,109,353, Cl. 28-104.000.
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Edick, John D.; and Ostrander, Kenneth A., 4,110,676, Cl. 322-31.000.
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Esser, Gustav, 4,109,560, Cl. 90-96.000.
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Canalizo, Carlos R., 4,109,716, Cl. 166-191.000.
Ott, Charlotte A. Sun shield. 4,109,322, Cl. 2-177.000.
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Otto, Oberdan W., to Hughes Aircraft Company. Surface acoustic wave filter. 4,110,714, Cl. 333-72.000.
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Parbhoo, Kantilal R.; Klink, Jerome P.; Calland, John P.; and White, Gerald L., 4,109,610, Cl. 118-202.000.
Poulsen, Peder Ulrik, 4,110,149, Cl. 156-429.000.
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Go, Santos W., 4,110,315, Cl. 528-294.000.
Stengle, Edward J., Jr., 4,110,095, Cl. 65-26.000.
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Moore, Edward Joseph; and Owens, John Edward, 4,110,810, Cl. 361-213.000.
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Creutz, Hans-Gerhard, deceased; and Herr, Roy Wilbur, 4,110,176, Cl. 204-52.00R.
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Stewart, Maurice M., 4,109,828, Cl. 222-3.000.
Ozaki, Tadashi: *See*—
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Gilmour, Alexander; and Mallory, Henry Rodgers, 4,110,518, Cl. 429-174.000.
Pacific West Exploration Company: *See*—
Hebberd, Harry Clinton, 4,109,757, Cl. 181-401.000.
Pacifici, James G.: *See*—
Sloan, Cephas H.; and Pacifici, James G., 4,110,187, Cl. 204-159.190.
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Papa, Anthony Joseph: *See*—
Boros, Eugene Joseph; and Papa, Anthony Joseph, 4,110,415, Cl. 260-953.000.
Papalos, John George, to Diamond Shamrock Corporation. Sulfonated alkylphenoxy acetones. 4,110,367, Cl. 260-511.000.
Papenfuhs, Theodor; and Volk, Heinrich, to Hoechst Aktiengesellschaft. Novel 2-hydroxynaphthalene-1-aldehydes, process for preparing them and their use. 4,110,375, Cl. 260-559.00R.
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Hildebrand, Richard Emil; Paraskos, John Angelo; and Taylor, Herman, Jr., 4,110,192, Cl. 208-8.000.
Parbhoo, Kantilal R.; Klink, Jerome P.; Calland, John P.; and White, Gerald L., to Owens-Corning Fiberglas Corporation. Textile size applicator with a temperature controlling fluid. 4,109,610, Cl. 118-202.000.
Parikh, Prakash D.; and Shapiro, Eugene, to Olin Corporation. Improved copper base alloys. 4,110,132, Cl. 148-32.000.

Park, Jack H.: *See*—
Widmyer, Richard H.; and Park, Jack H., 4,109,722, Cl. 166-281.000.

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Parker, Roger Alan, to Richardson-Merrell Inc. Hypolipidemic agents RO- or RS- substituted furoic acids, esters and salts. 4,110,351, Cl. 260-347.200.

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Harrison, Peter Arthur; Parks, Anthony John; Southgate, Malcolm Dennis; Sleath, William Derek; and Hills, Richard Keith, 4,110,037, Cl. 355-48.000.

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Hajos, Zoltan George; and Parrish, David Richard, 4,110,380, Cl. 260-586.00C.

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Higgerson, Raymond; and Parsons, David, 4,109,773, Cl. 192-111.00A.

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Parsons, James W., 4,109,422, Cl. 51-325.000.

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Roccaforte, Harry I.; and Pasquale, William D., 4,109,786, Cl. 206-45.140.

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Voss, Peter, 4,110,638, Cl. 307-252.00C.

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Souder, James J., Jr.; and Waldorf, Lindsey E., 4,110,587, Cl. 219-10.49R.

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Porter, Marion G.; and Patterson, Garvin Wesley, 4,110,822, Cl. 364-200.000.

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Mattson, Arne J., 4,109,975, Cl. 308-26.000.

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Woeckener, Willi; Pawelczyk, Werner; and Marquardt, Klaus-Dieter, 4,110,387, Cl. 264-40.500.

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Baer, James, 4,110,502, Cl. 428-40.000.

Payne, George C., to White's Electronics, Inc. Ferrous/non-ferrous metal detector using sampling. 4,110,679, Cl. 324-3.000.

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Pechinger, Ernst: *See*—
Bauer, Karl A.; Baur, Peter F.; Biedermann, Horst H.; Madel, Andreas; Nitsch, Friedrich; Pechinger, Ernst; Koenig, Walter; Ipfelkofer, Armin; Rindsfuesser, Johann J.; and Weber, Helmut, 4,109,779, Cl. 400-584.000.

Peclard, Michel, to Les Products Associes LPA SA. Reservoir with handle and cover. 4,109,650, Cl. 128-66.000.

Peek, S. Christopher, to GTE Sylvania Incorporated. Frost detector. 4,109,481, Cl. 62-140.000.

Peev, Vassil Georgiev; Valchev, Alexander Yordanov; and Bakalov, Nikolay Georgiev, to DSO "Cherna Metalurgia". Method of steelmaking with direct current. 4,110,547, Cl. 13-11.000.

Pellenc, Roger Joseph. Hydraulic secateurs. 4,109,381, Cl. 30-228.000.

Pender, David R. Vertical take-off and landing aircraft. 4,109,885, Cl. 244-7.00R.

Pennings, Matheus D.; and Tippin, Billy B., to Sola Basic Industries, Inc. Automatic height sensor for semiconductor bonding tool, wafer probe or the like. 4,109,846, Cl. 228-4.500.

Perepelkin, Arkady Vitalievich: *See*—
Vorona, Dmitry Afanasievich; Chikul, Vitaly Ivanovich; Smirnov, Alexandr Stepanovich; Chikul, Olga Semenovna; Yagunov, Boris Ivanovich; Tager, Semen Alexandrovich; Shipkov, Nikolai Nikolaevich; Perepelkin, Arkady Vitalievich; Grigorieva, Elizaveta Alexeevna; Krasnovsky, Gennady Alexeevich, deceased; and Krasnovskaya, Tatyana Sergeevna, administratrix, 4,110,064, Cl. 431-171.000.

Perles, Rene, to Verdol S.A. Clutch devices. 4,109,770, Cl. 192-12.0BA.

Permataet Kobenhavn A/S: *See*—
Wiene, Ole, 4,110,388, Cl. 264-71.000.

Perrain, Maurice Eugene, to Pont-a-Mousson S.A. Fire-proof device for a tube of fusible material which extends through a wall. 4,109,423, Cl. 52-1.000.

Perraudin, Claude: *See*—
Azam, Guy; and Perraudin, Claude, 4,110,623, Cl. 250-398.000.

Persico, Paul J.: *See*—
Millar, Robert F.; Persico, Paul J.; and Jensen, Robert H., 4,110,081, Cl. 23-288.00G.

Peters, Johannes, to Bolkow Gesellschaft mit beschrankter Haftung. Apparatus for transmission of messages by means of electromagnetic waves. 4,110,724, Cl. 340-4.00A.

Peterson, Charles Edwin: *See*—
Brown, Leon Calvin; Edwards, Earl Garland; Peterson, Charles Edwin; Robinson, Peter George; and Wilson, Clement Card, 4,110,068, Cl. 432-60.000.

Peterson, Glenn R.; Hicks, Marvin C.; and Schwartz, Peter W., to Intermountain Oil Research, Inc. Process and apparatus for extracting bituminous oil from tar sands. 4,110,194, Cl. 208-11.0LE.

Peterson, Jerry D.; and Knief, Gerald L., to Ritchie Industries, Inc. Plastic pipe heater. 4,110,603, Cl. 219-535.000.

Petri, Ulrich: *See*—
Krohn, Hans Guenther; Rademacher, Friedrich; Petri, Ulrich; and Deubel, Hans D., 4,109,446, Cl. 53-282.000.

Petrie, Adelore F. Digital waveform conditioning circuit. 4,110,698, Cl. 328-164.000.

Petrosky, Kenneth J., to Westinghouse Electric Corp. Sequential tone acoustic command link. 4,110,725, Cl. 340-5.00R.

Pettersson, Bror Gosta, to AB Bofors. Method of producing the hydrochloride of N-methyl piperidine-2-carboxylic acid-2,6-xylidide. 4,110,331, Cl. 260-293.770.

Pettersson, Torulf; Fladda, Gerdt; and Eriksson, Lennart, to Svenska Traforskningsinstitutet. Method for determination of concentration. 4,110,044, Cl. 356-103.000.

Pettit, Donald: *See*—
Carter, Alan Reginald; Pettit, Donald; and Langerwerf, Josephus Sychbertus, 4,110,495, Cl. 427-400.000.

Pfaehler, Josephine. Cabinet-like furniture unit of cellular structure. 4,109,981, Cl. 312-107.000.

Pfaff Industriemaschinen GmbH: *See*—
Bungert, Heinrich; Wenz, Herbert; and Wentz, Klaus, 4,109,334, Cl. 12-59.500.

Pfahler, Gerhard: *See*—
Mayer, Norbert; Pfahler, Gerhard; and Wiezer, Hartmut, 4,110,334, Cl. 260-293.660.

Pfeffer, Johann Baptist, to S.A. Block & Concrete (Proprietary) Limited. Drainage device for particulate material. 4,110,214, Cl. 210-77.000.

Pfizer Inc.: *See*—
Bigham, Eric C., 4,110,342, Cl. 260-332.20A.
Sciavolino, Frank C., 4,110,530, Cl. 536-9.000.
Sciavolino, Frank C., 4,110,531, Cl. 536-9.000.

Pharis, Richard Persons. Method and composition for treating trees. 4,110,102, Cl. 71-89.000.

Philips Roxane, Inc.: *See*—
Purdy, Charles W., III, 4,110,433, Cl. 424-89.000.

Phillips Cable Limited: *See*—
Beach, Shirley, 4,110,137, Cl. 156-48.000.

Phillips, Claude T.: *See*—
Loveless, John H.; and Phillips, Claude T., 4,110,493, Cl. 427-233.000.

Phillips, Jacque R. Tax adjusting vehicle gasoline filler equipment. 4,109,686, Cl. 141-1.000.

Phillips Petroleum Company: *See*—
Barber, Franklin T., 4,110,177, Cl. 204-59.00F.
Hessert, James E.; and Johnston, Chester C., Jr., 4,110,230, Cl. 252-855.00R.
Smith, Clifford E.; and Holtz, Hans D., 4,110,252, Cl. 252-442.000.
Swanson, Billy L., 4,110,226, Cl. 252-8.50C.
Swanson, Billy L., 4,110,231, Cl. 252-8.50C.
Wood, Roy F.; and Wynne, Ralph A., 4,109,941, Cl. 285-111.000.

Pickering, Timothy L.; and Hendrickson, James I., to Ciba-Geigy Corporation. Processing aids for high temperature polymers. 4,110,294, Cl. 260-30.200.

Pickford Holland & Company Limited: *See*—
Shaw, Gordon Brian; and Brinkman, Richard John, 4,110,545, Cl. 13-6.000.

Pietzsch, Siegfried: *See*—
Bildstein, Siegfried; Lademann, Rudolf; Pietzsch, Siegfried; and Schaeffer, Georg, 4,110,365, Cl. 260-505.00C.

Pilhall, Stig Tore Lennart, to AB Volvo. Towing device for motor vehicles. 4,109,930, Cl. 280-491.00B.

Pilz, Reiner. Multipane insulating glass process and rim strip. 4,109,432, Cl. 52-172.000.

Ping, David T., to Caterpillar Tractor Co. Flexible engine cowling for construction vehicles. 4,109,744, Cl. 180-68.00P.

Pioneer Electronic Corporation: *See*—
Kinoshita, Shouzo, 4,109,983, Cl. 312-214.000.

Pirck, Dietrich; and Fuchs, Gundolf, to Deutsche Texaco Aktiengesellschaft. Process for preparing a cold-set lacquer. 4,110,282, Cl. 260-23.0AR.

Pirkulov, Vladimir Georgievich; Askarov, Mikhail Arkadievich; and Dzhashi, Avtandil Vladimirovich. Method of manufacturing active material for lead batteries. 4,110,241, Cl. 252-182.100.

Pitney-Bowes, Inc.: *See*—
Irvine, Robert; Luperti, Harry E.; and Manna, Robert E., 4,110,038, Cl. 355-50.000.
Luperti, Harry E.; and Manna, Robert E., 4,110,041, Cl. 355-75.000.

Plachy, William M.: *See*—
O'Brian, Edward D.; and Plachy, William M., 4,109,427, Cl. 52-58.00R.
O'Brian, Edward D.; and Plachy, William M., 4,109,933, Cl. 280-653.000.
Plastic Reel Corporation of America: *See*—
Fattori, Lazzaro A.; and Fattori, Joseph E., 4,109,789, Cl. 206-404.000.
Platt Saco Lowell: *See*—
Yates, Stephen William, 4,109,877, Cl. 242-54.400.
Player, Wayne H.; and Barton, Forris W., Jr., to Howmet Corporation. Building panel. 4,109,437, Cl. 52-536.000.
Plen, Abraham. Wind energy accumulator. 4,109,465, Cl. 60-398.000.
Plessey Handel und Investments A.G.: *See*—
Porter, Stephen George; and Appleby, David, 4,110,616, Cl. 250-338.000.
Ploszaj, Leon C.: *See*—
Laakaniemi, Richard N.; Ploszaj, Leon C.; and Schultz, Bruce R., 4,110,140, Cl. 156-87.000.
Podos, Steven M.: *See*—
Becker, Bernard; Stamper, Robert L.; Asseff, Carl F.; and Podos, Steven M., 4,110,461, Cl. 424-273.00R.
Pohler, Heinz: *See*—
Hagen, Albert; Kaiser, Theodor; and Pohler, Heinz, 4,109,361, Cl. 29-148.40C.
Polaroid Corporation: *See*—
Bloom, Stanley M., 4,110,355, Cl. 260-372.000.
Finnemore, Fred M., 4,110,018, Cl. 352-130.000.
Haas, Howard C.; and Moreau, Robert D., 4,110,424, Cl. 423-365.000.
Leduc, Robert D., 4,109,947, Cl. 292-76.000.
Poletto, John Frank: *See*—
Floyd, Middleton Brawner, Jr.; Weiss, Martin Joseph; Poletto, John Frank; Schaub, Robert Eugene; and Bernady, Karel Francis, 4,110,368, Cl. 260-514.00D.
Polizzi, Joseph R.; and Hart, Richard K. Quickly removable windshield curtain. 4,109,957, Cl. 296-95.00C.
Pollard, Edward L.: *See*—
Balcom, Orville R.; Hildebrand, Cleve R.; and Pollard, Edward L., 4,109,389, Cl. 33-363.00K.
Pollitzer, Ernest L.: *See*—
Hayes, John C.; and Pollitzer, Ernest L., 4,110,198, Cl. 208-111.000.
Pollock International Limited: *See*—
Pollock, James Richard Allan; and Dale, Anthony Richard, 4,110,480, Cl. 426-436.000.
Pollock, James Richard Allan; and Dale, Anthony Richard, to Pollock International Limited. Treatment of malt to reduce stale flavor in beer. 4,110,480, Cl. 426-436.000.
Polvara, Giulio, to Beylerian Limited; and Kartell, S.p.A. Multiple element for forming various structures when connected to box-form panels for furniture or the like. 4,110,052, Cl. 403-295.000.
Polysius AG: *See*—
Lohnherr, Ludger, 4,109,871, Cl. 241-24.000.
Ponce, Rodger G.: *See*—
Herrera, Frank J.; and Ponce, Rodger G., 4,109,568, Cl. 99-477.000.
Pons, Dick A.; and Bijker, Anno, to Synres International B.V. Process for the preparation of stable aqueous emulsions of addition polymers and copolymers. 4,110,285, Cl. 260-29.6MP.
Pont-a-Mousson S.A.: *See*—
Perrain, Maurice Eugene, 4,109,423, Cl. 52-1.000.
Poore, Bernard Brandt, to Deere & Company. Vehicular single shaft gas turbine engine power system. 4,109,772, Cl. 192-0.092.
Population Research, Inc.: *See*—
Bolduc, Lee R.; and Dickhudt, Eugene A., 4,109,654, Cl. 128-235.000.
Porsche Design Ferdinand A. Porsche: *See*—
Matthias, Jan Henner, 4,109,323, Cl. 2-410.000.
Porta, Gary Douglas: *See*—
Hughes, Donald Wayne Kent; and Porta, Gary Douglas, 4,109,992, Cl. 339-147.00R.
Porter, Marion G.; and Patterson, Garvin Wesley, to Honeywell Information Systems, Inc. Instruction look ahead having prefetch concurrency and pipeline features. 4,110,822, Cl. 364-200.000.
Porter, Stephen George; and Appleby, David, to Plessey Handel und Investments A.G. Pyroelectric detectors. 4,110,616, Cl. 250-338.000.
Portlandzementwerk Dotternhausen Rudolf Rohbach Kommanditgesellschaft: *See*—
Rechmeier, Helmuth; and Rohrbach, Gerhard, 4,110,121, Cl. 106-100.000.
Portmann, Hubert: *See*—
Laesser, Claude; and Portmann, Hubert, 4,109,457, Cl. 58-43.000.
Post Office, The: *See*—
Cochrane, Peter, 4,110,572, Cl. 179-175.30R.
Garrett, Ian; and Taylor, Michael Rivers, 4,110,133, Cl. 148-171.000.
Post, Willem Pieter. Process for applying a threaded seat in a metal plate. 4,109,600, Cl. 113-121.00R.
Potschka, Joseph: *See*—
Potter, Dennis G.; Dietrich, Hagen; and Potschka, Joseph, 4,109,948, Cl. 292-169.150.
Potter, Anthony Charles: *See*—
Batey, John Walter; and Potter, Anthony Charles, 4,110,590, Cl. 219-75.000.
Potter, Dennis G.; Dietrich, Hagen; and Potschka, Joseph, to Norris Industries. Plastic latch bolt for door lock. 4,109,948, Cl. 292-169.150.
Potter, James Charles, to C.A.V. Limited. Fuel injection pumping apparatus. 4,109,629, Cl. 123-140.00R.
Poulsen, Peder Ulrik, to Owens-Corning Fiberglas Corporation. Rotatably driven mandrel having outer wall formed by continuously circulating endless helical band and radially adjustable support members for the band. 4,110,149, Cl. 156-429.000.
Povejsil, James H., to Towmotor Corporation. Combined throttle and transmission system. 4,109,546, Cl. 74-474.000.
Powers, Larry J.: *See*—
Moser, Robert E.; Powers, Larry J.; and Ariyan, Zaven S., 4,110,451, Cl. 424-251.000.
Powers Manufacturing, Inc.: *See*—
Powers, Whitney S., Jr.; Hobler, Ross L.; Bryant, Nelson H.; and Allen, Wilbur J., 4,109,511, Cl. 73-37.600.
Powers, Richard J. Adjustable height table. 4,109,588, Cl. 108-12.000.
Powers, Whitney S., Jr.; Hobler, Ross L.; Bryant, Nelson H.; and Allen, Wilbur J., to Powers Manufacturing, Inc. Method and apparatus for statistically testing frangible containers. 4,109,511, Cl. 73-37.600.
PPG Industries, Inc.: *See*—
Bosso, Joseph F.; and Castellucci, Nicholas T., 4,110,287, Cl. 260-29.2EP.
DeTorre, Robert P., 4,109,841, Cl. 225-96.500.
Mazzoni, Renato J.; and Bowser, George H., 4,109,431, Cl. 52-172.000.
Motsinger, Donald L., 4,110,094, Cl. 65-3.00C.
Rechlicz, Thomas A., 4,110,153, Cl. 156-633.000.
Seymour, Samuel L., 4,109,953, Cl. 294-118.000.
Pradal, Bortolo Mario, to RCA Corporation. Audio signal processor. 4,110,692, Cl. 325-147.000.
Precision Metalsmiths, Inc.: *See*—
Miller, Robert R.; and Horton, Robert A., 4,109,699, Cl. 164-244.000.
Preeschl, Raymond C. Bite signalling fishing bobber with flexible housing. 4,109,404, Cl. 43-17.000.
Press- und Stanzwerk AG: *See*—
Mettler, Karl; Marxer, Paul; and Tiefenthaler, Arthur, 4,110,051, Cl. 403-157.000.
Prewo, Karl M., to United Technologies Corp. Quick bond composite and process. 4,110,505, Cl. 428-114.000.
Price, Ernest James, to E. J. Price (Developments) Limited. Filters. 4,109,676, Cl. 137-550.000.
Price-Pfister Brass Mfg. Co.: *See*—
Szemeredi, Robert S., 4,109,672, Cl. 137-315.000.
Primary Children's Hospital: *See*—
Clark, Justin S.; and Veasy, Lloyd George, 4,109,505, Cl. 73-1.00R.
Prince, Dominique: *See*—
Frade, Gilbert; Escher, Balint; and Prince, Dominique, 4,110,815, Cl. 361-433.000.
Prince, Leland S.; and Yarnell, Neil K. Utility meter readout system. 4,110,606, Cl. 235-432.000.
Prince, Leon M., to Lever Bros. Co. Quick lathering toilet bars and method of making same. 4,110,239, Cl. 252-135.000.
Procter & Gamble Company, The: *See*—
Arnau, Jose Luis; Barrat, Christian Roland; and Wevers, Jean, 4,110,262, Cl. 252-545.000.
Benedict, James John, 4,110,083, Cl. 51-295.000.
Benjamin, Lawrence; and Walsh, Michael Andrew, 4,110,498, Cl. 428-35.000.
DesMarais, Thomas A., 4,110,276, Cl. 521-123.000.
Grubbs, Dennis Robert; Lubsen, Timothy Andrew; and Roseberry, George Leroy, Jr., 4,110,485, Cl. 426-595.000.
Liepa, Alexander L.; and Japikse, Cornelis H., 4,110,255, Cl. 252-455.00Z.
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Olsson, Rune, 4,109,348, Cl. 24-153.000.
Prokai, Bela: *See*—
Kanner, Bernard; and Prokai, Bela, 4,110,271, Cl. 521-111.000.
Kanner, Bernard; and Prokai, Bela, 4,110,272, Cl. 521-111.000.
Properzi, Giulio. Method and apparatus for collecting wire rod or the like at the outlet of a rolling mill. 4,109,879, Cl. 242-82.000.
Pugh, Daniel B.; and Cataldo, Thomas M. Forearm mounted support for lift weights. 4,109,908, Cl. 272-119.000.
Purdy, Charles W., III, to Philips Roxane, Inc. Equine Rhinopneumonitis Virus. 4,110,433, Cl. 424-89.000.
Purhonen, Matti, to Temet OY. Noise absorber for air or gas flows. 4,109,754, Cl. 181-252.000.
Puschel, Walter: *See*—
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Putney, Zimri Congdon: *See*—
Bergeron, David Leo; Putney, Zimri Congdon; and Stephens, Geoffrey Brownell, 4,110,126, Cl. 148-1.500.
Quackenbush, Carr Lane W.: *See*—
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Quasar Electronics Corporation: *See*—
Nakanishi, Mutsuo; and Schmidt, Hans, 4,110,721, Cl. 338-128.000.
Queich, Alan Ralph. Method and apparatus for de-stacking trays. 4,109,803, Cl. 214-8.50D.
Quigley, James R., to TRW Inc. Wire terminating tool. 4,109,370, Cl. 29-566.300.
Quirk, Virgil P., to Stackpole Carbon Company. Hair setting roller. 4,109,667, Cl. 132-33.00R.

Raabe, Paul J.: *See—*
Tarbell, Harlan E.; and Raabe, Paul J., 4,110,501, Cl. 428-40.000.
Rademacher, Friedrich: *See—*
Krohn, Hans Guenther; Rademacher, Friedrich; Petri, Ulrich; and Deubel, Hans D., 4,109,446, Cl. 53-282.000.
Rady, Bruce A.: *See—*
Johnson, Delmar R.; Flint, John R.; Wells, Thomas R.; Erikson, Rolf B.; and Rady, Bruce A., 4,110,020, Cl. 353-26.00A.
Ragen, Peter D. Boat hoists. 4,109,896, Cl. 254-144.000.
Railway Engineering & Supply Company, Inc.: *See—*
Bailey, John D., 4,109,847, Cl. 228-119.000.
Rain Kogyo Kabushiki Kaisha: *See—*
Nakai, Isao, 4,109,782, Cl. 198-781.000.
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Daeschler, Werner; and Rainer, Hans, 4,110,091, Cl. 62-54.000.
Raisin, Jean-Pierre: *See—*
Ducol, Jean-Paul; Gobry, Dominique; Raisin, Jean-Pierre; and Agence Nationale de Valorisation de la Recherche (ANVAR), 4,109,595, Cl. 112-121.110.
Rakacs, Joseph G., to Singer Company, The. Buttonhole sewing presser device with interlock finger. 4,109,591, Cl. 112-76.000.
Randell, Donald Richard: *See—*
Holt, Brian; and Randell, Donald Richard, 4,110,305, Cl. 260-45.80N.
Randolph, Robert C. Shoe support apparatus. 4,109,335, Cl. 12-123.000.
Rank Xerox, Ltd.: *See—*
Kamata, Akira, 4,110,035, Cl. 355-15.000.
Rao, G. R. Mohan; Stanczak, John S.; Lien, Jih-Chang; and Bhatia, Shyam, to Texas Instruments Incorporated. Semiconductor integrated circuit with implanted resistor element in polycrystalline silicon layer. 4,110,776, Cl. 357-23.000.
Rao, S. Chandrasekhara, to Bogue Electric Manufacturing Company. AC synchronous motor having an axially laminated rotor. 4,110,646, Cl. 310-163.000.
Rapoport, Henry; and Barber, Randy B., to University of California, The Regents of the. Metallic derivatives of neopinone ketal. 4,110,329, Cl. 260-270.00A.
Rathbone, Ronald; and Schwabe, Ulrich, to Siemens Aktiengesellschaft. High frequency transistor. 4,110,779, Cl. 357-34.000.
Rathi, Ram N.: *See—*
Hornagold, John T.; Beckley, Gary H.; and Rathi, Ram N., 4,109,747, Cl. 180-140.000.
Ratsko, Istvan: *See—*
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Ratti, Franco; Vivarelli, Gianantonio; Maganza, Dario; and D'Amore, Emanuele, to Societa Italiana Telecommunicazioni Siemens S.p.A. Manipulator for the insertion and extraction of printed-circuit boards into and from a holder therefor. 4,109,379, Cl. 29-747.000.
Rauma-Repola OY: *See—*
Berg, Niilo Nikodemus, 4,109,690, Cl. 144-163.000.
Ora, Alpo, 4,110,154, Cl. 162-36.000.
Rausing, Hans A., to AB Ziristor. Container closure. 4,109,814, Cl. 215-217.000.
Raymond Lee Organization, Inc., The: *See—*
Cundiff, Otha G., Jr., 4,109,759, Cl. 182-19.000.
Zmiarovich, Thomas George, 4,109,333, Cl. 5-368.000.
Raytheon Company: *See—*
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RCA Corporation: *See—*
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Brooks, Ronald Robert, 4,109,632, Cl. 123-148.00E.
Dischert, Robert Adams; and Walter, James Morgan, 4,110,785, Cl. 358-19.000.
Elliott, Charles Anthony; and Huff, Larry Dean, 4,109,919, Cl. 274-9.00B.
Evans, Wayne Wheeler, 4,110,693, Cl. 325-419.000.
Maxemchuk, Nicholas Frank, 4,110,735, Cl. 340-146.1AQ.
Parker, Robert Preston, 4,110,787, Cl. 358-34.000.
Pradal, Bortolo Mario, 4,110,692, Cl. 325-147.000.
Risko, John Joseph, 4,110,488, Cl. 427-84.000.
Rosen, Arye; and Mykietyn, Edward, 4,110,700, Cl. 329-103.000.
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Cole, Martin; Howarth, Thomas Trevor; and Reading, Christopher, 4,110,165, Cl. 195-80.00R.
Rechlicz, Thomas A., to PPG Industries, Inc. Method of forming a microporous diaphragm. 4,110,153, Cl. 156-633.000.
Rechmeier, Helmuth; and Rohrbach, Gerhard, to Portlandzementwerk Dotternhausen Rudolf Rohbach Kommanditgesellschaft. Process for producing cement clinker. 4,110,121, Cl. 106-100.000.
Red, Jerry F. P.: *See—*
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Reddy, Thomas B., to American Cyanamid Company. Electrolytes for use in electrochromic devices. 4,110,015, Cl. 350-357.000.
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Reed, Charles J.; and Cook, Claren K., to Ametek, Inc. Diaphragm seal for pressure sensing instrument. 4,109,535, Cl. 73-706.000.
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Reed, Gerald M.; and Carpin, George E. Dental implant bender. 4,109,383, Cl. 32-10.00A.
Reed, Lowell E.: *See—*
Halsey, Homer P.; Reed, Lowell E.; and Hildebrand, David C., 4,110,824, Cl. 364-472.000.
Reed, Richard E., to CAF Industries. Fresh water supply and waste water retention system. 4,109,604, Cl. 114-270.000.
Reeves Brothers, Inc.: *See—*
Findlay, Allen Cameron, 4,109,443, Cl. 53-118.000.
Regal Tool & Rubber Co., Inc.: *See—*
Files, James H.; Montague, John M.; and Thomerson, Clarence T., 4,109,474, Cl. 61-48.000.
Regan, A. Michael, to Regan Offshore International, Inc. Safety apparatus for automatically sealing hydraulic lines within a sub-sea well casing. 4,109,712, Cl. 166-340.000.
Regan Offshore International, Inc.: *See—*
Regan, A. Michael, 4,109,712, Cl. 166-340.000.
Reggia, Frank; and Jones, Howard S., Jr., to United States of America, Army. Very thin (wrap-around) conformal antenna. 4,110,751, Cl. 343-700.0MS.
Regie Nationale des Usines Renault: *See—*
Rivere, Jean-Pierre, 4,109,623, Cl. 123-119.0EC.
Rivere, Jean Pierre, 4,109,669, Cl. 137-101.190.
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Mollet, Hans; and Rehmann, Wolfgang, 4,110,073, Cl. 8-85.00R.
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Reid, John M.; and Spencer, Merrill P., to Institute of Applied Physiology & Medicine. Apparatus for ultrasonic arteriography. 4,109,642, Cl. 128-2.00V.
Reindel, John, to United States of America, Navy. Broadband high pass microwave filter. 4,110,715, Cl. 333-73.00S.
Reinecke, Erich, to WABCO Westinghouse GmbH. Automatic load-dependent brake power regulator for vehicles. 4,109,969, Cl. 303-22.00R.
Reliance Electric Company: *See—*
Edick, John D.; and Ostrander, Kenneth A., 4,110,676, Cl. 322-31.000.
Reneau, Bobby J. Coupling apparatus. 4,109,940, Cl. 285-18.000.
Reneau, Bobby J.: *See—*
Manchester, Luther L.; and Reneau, Bobby J., 4,109,945, Cl. 285-323.000.
Research Fuels, Inc.: *See—*
Ottenstein, Allan S.; and Callahan, John A., 4,109,777, Cl. 400-124.000.
Research Institute for Iron, Steel and Other Metals of the Tohoku University, The: *See—*
Yajima, Seishi; Hayashi, Josaburo; Omori, Mamoru; Hamano, Masaaki; and Shishido, Toetsu, 4,110,386, Cl. 264-29.500.
Respiratory Care, Inc.: *See—*
Miller, Kenneth G., 4,110,419, Cl. 261-142.000.
Reynolds, Linda M., to Gates Rubber Company, The. Curved tubular articles and method. 4,110,396, Cl. 264-236.000.
Reyrolle Parsons Limited: *See—*
Batey, John Walter; and Potter, Anthony Charles, 4,110,590, Cl. 219-75.000.
Rheem Manufacturing Company: *See—*
Velarde, Clyde R., 4,109,363, Cl. 29-243.560.
Rheinische Braunkohlenwerke AG.: *See—*
Hilberath, Friedrich; and Teggers, Johannes, 4,109,701, Cl. 165-1.000.
Rheinmetall GmbH: *See—*
Haep, Heinz; and Schumacher, Georg, 4,109,582, Cl. 102-93.000.
Rho Sigma: *See—*
Keegan, Partick J., 4,109,639, Cl. 126-271.000.
Rhodenizer, Harold L.: *See—*
Grunwald, John J.; D'Ottavio, Eugene D.; Rhodenizer, Harold L.; and Lombardo, Michael S., 4,110,147, Cl. 156-306.000.
Rhodes, Arthur J.; and Rhodes, William J. Feed guide attachment for band saw machines. 4,109,554, Cl. 83-565.000.
Rhodes, Kenneth H., to Johnson/Rhodes Cultured Foods, Inc. Preparation of liquid and frozen yogurt products. 4,110,476, Cl. 426-41.000.
Rhodes, William J.: *See—*
Rhodes, Arthur J.; and Rhodes, William J., 4,109,554, Cl. 83-565.000.
Rhone-Poulenc Industries: *See—*
Barreau, Michel; Cotrel, Claude; and Jeanmart, Claude, 4,110,450, Cl. 424-250.000.
Decor, Jean-Pierre, 4,110,538, Cl. 560-11.000.
Rhone-Progil: *See—*
Violland, Robert; and Neel, Jean, 4,110,284, Cl. 260-29.2TN.
Richard, Raymond L., Jr., to General Motors Corporation. Method of manufacture energy absorber. 4,109,367, Cl. 29-436.000.
Richardson, John Gilbert: *See—*
Gower, Reginald Price, II; and Richardson, John Gilbert, 4,110,247, Cl. 252-313.00R.
Richardson-Merrell Inc.: *See—*
Parker, Roger Alan, 4,110,351, Cl. 260-347.200.
Richardson, Warner G., to Caterpillar Tractor Co. Scraper unloading system. 4,109,400, Cl. 37-126.0AC.

Richeson, William E., Jr.; and Kray, Gerald L., to Magnavox Company, The. Breakerless electronic ignition system. 4,109,630, Cl. 123-148.00E.
Richter Gedeon Vegyeszeti Gyar Rt: *See*—
Tuba, Zoltan; and Marsai, Maria, 4,110,326, Cl. 260-239.55R.
Richter, Sidney B.: *See*—
Stach, Leonard J.; Hotz, Roger D.; and Richter, Sidney B., 4,110,101, Cl. 71-88.000.
Ricoh Company, Ltd.: *See*—
Ebi, Yutaka; and Saitou, Masatoshi, 4,110,031, Cl. 355-14.000.
Suzuki, Minoru, 4,110,034, Cl. 355-15.000.
Tabata, Yasuhiro, 4,110,025, Cl. 355-3.0SH.
Ridley, Richard D., to Occidental Oil Shale, Inc. Method for preconditioning oil shale preliminary to explosive expansion and in situ retorting thereof. 4,109,964, Cl. 299-2.000.
Righelato, Renton Clive; and Jarman, Trevor Rodney, to Tate & Lyle Limited. Production of a polysaccharide under carbon limiting conditions. 4,110,162, Cl. 195-31.00P.
Rindsfuesser, Johann J.: *See*—
Bauer, Karl A.; Baur, Peter F.; Biedermann, Horst H.; Madel, Andreas; Nitsch, Friedrich; Pechinger, Ernst; Koenig, Walter; Ipfelkofer, Armin; Rindsfuesser, Johann J.; and Weber, Helmut, 4,109,779, Cl. 400-584.000.
Rion, Richard G., to Ferro Corporation. Dual coat ceramic layer prepared by single firing. 4,110,487, Cl. 427-27.000.
Risdon Manufacturing Company, The: *See*—
Kalat, Edwin F., 4,110,427, Cl. 424-46.000.
Risko, John Joseph, to RCA Corporation. Method for making Schottky barrier diodes. 4,110,488, Cl. 427-84.000.
Ritchie Industries, Inc.: *See*—
Peterson, Jerry D.; and Knief, Gerald L., 4,110,603, Cl. 219-535.000.
Rivere, Jean-Pierre, to Regie Nationale des Usines Renault. Regulator for auxiliary air injection at the intake of internal combustion engines. 4,109,623, Cl. 123-119.0EC.
Rivere, Jean Pierre, to Regie Nationale des Usines Renault; and Societe dite Automobiles Peugeot. Electronic fuel injection system for internal combustion engines. 4,109,669, Cl. 137-101.190.
Robert Bosch GmbH: *See*—
Goetzke, Siegfried; and Jakob, Gert, 4,110,549, Cl. 174-16.0HS.
Maly, Hans-Peter, 4,110,789, Cl. 358-148.000.
Niklaus, Bernd, 4,109,529, Cl. 74-388.00R.
Odor, Frank; Mohr, Adolf; and Bolenz, Klaus, 4,110,718, Cl. 335-296.000.
Thiele, Hubertus, 4,110,642, Cl. 310-51.000.
Zechnall, Richard; and Baumann, Gunther, 4,109,616, Cl. 123-32.0EA.
Roberts, Fred B., to Burlington Industries, Inc. No roll stocking and method. 4,109,492, Cl. 66-172.00E.
Roberts, Marvin E. Key and tumbler construction. 4,109,495, Cl. 70-365.000.
Roberts, Marvin E. Key construction. 4,109,497, Cl. 70-403.000.
Roberts, Richard Steven. Device for attaching a fluid carrying hose to a receptacle drain. 4,109,939, Cl. 285-8.000.
Roberts, Scott C.: *See*—
Gwyn, John E.; and Roberts, Scott C., 4,110,193, Cl. 208-11.00R.
Robertshaw Controls Company: *See*—
Decker, Cloyd E., 4,110,601, Cl. 219-506.000.
Robertson, Allen R.; and Hill, James S., to Engelhard Minerals & Chemicals Corporation. Thick film thermocouples. 4,110,124, Cl. 136-236.00R.
Robinson, Peter George: *See*—
Brown, Leon Calvin; Edwards, Earl Garland; Peterson, Charles Edwin; Robinson, Peter George; and Wilson, Clement Card, 4,110,068, Cl. 432-60.000.
Roccaforte, Harry I.; and Pasquale, William D., to Champion International Corporation. Carton for round articles. 4,109,786, Cl. 206-45.140.
Rocholl, Martin-Gottfried, to Teroson G.m.b.H. Apparatus for rapidly producing cemented panes of insulating glass. 4,110,148, Cl. 156-359.000.
Rock, Erich; and Mages, Bernhard, to Julius Blum Gesellschaft m.b.H. Hinge with closing means. 4,109,344, Cl. 16-144.000.
Rockwell International Corporation: *See*—
Harris, James S., Jr.; Eden, Richard C.; Cory, Earl S.; and Scholl, Fred W., 4,110,661, Cl. 313-499.000.
Loyd, Morris S., 4,109,435, Cl. 52-309.100.
Molina, Orlando G., 4,110,236, Cl. 252-62.540.
Rodder, Jerome A. Fluid measuring apparatus. 4,109,510, Cl. 73-27.00R.
Roddy, Joseph T., to Emerson Electric Co. Dynamoelectric machine end shield arrangement. 4,110,644, Cl. 310-91.000.
Roder, Edgar; Merk, Fritz; and Rohrig, Luto, to Hoechst Aktiengesellschaft. Microfilm enlarging apparatus. 4,110,039, Cl. 355-68.000.
Rody, Jean: *See*—
Gilg, Bernard; Muller, Helmut; and Rody, Jean, 4,110,304, Cl. 260-45.80N.
Roger, Jean, to Aciers et Outillage Peugeot. Speed variator for a universal electric motor. 4,110,671, Cl. 318-227.000.
Rohm and Haas Company: *See*—
Geyer, Wolfgang G., 4,110,378, Cl. 260-558.00S.
Rohrbach, Gerhard: *See*—
Rechmeier, Helmuth; and Rohrbach, Gerhard, 4,110,121, Cl. 106-100.000.
Rohrig, Luto: *See*—
Roder, Edgar; Merk, Fritz; and Rohrig, Luto, 4,110,039, Cl. 355-68.000.
Roll Forming Corporation: *See*—
Brooks, Barlow W.; and Brooks, Barlow W., Jr., 4,109,499, Cl. 72-181.000.
Rollei-Werke Franke & Heidecke: *See*—
Scholz, Erwin, 4,110,773, Cl. 354-252.000.
Rollenitz, Leopold: *See*—
Bohm, Kurt; Rollenitz, Leopold; and Laurent, Francois, 4,110,005, Cl. 350-184.000.
Roller Bearing Company of America: *See*—
Koch, Hans W., 4,109,976, Cl. 308-36.100.
Roman, Alain; Sachetto, Jean-Pierre; Wust, Manfred; and Cuccolo, Sergio, to Neste Oy. Photosensitive material containing 2,3-di(2,3-diiodopropoxy)-propyl cellulose and uses thereof. 4,110,112, Cl. 96-1.0PC.
Roman, Ronald S., to Faygo Beverages, Inc. Forklift exhaust deflection shield and methods of constructing and utilizing same. 4,109,956, Cl. 296-78.00R.
Romanelli, Pat: *See*—
Kozam, George; and Romanelli, Pat, 4,109,653, Cl. 128-218.00R.
Rommel, Reiner. Crimping tool for producing solderless permanent electrical connections. 4,109,504, Cl. 72-407.000.
Ronc, Marcel, to Karl Ruggli AG. Manufacture of tampons. 4,109,354, Cl. 28-119.000.
Ronnevig, Carl M., to Skipsaksjeselskapet Suderoy. Vessel for working under water. 4,109,601, Cl. 114-314.000.
Rosch, Gunter: *See*—
Frischkorn, Hans; and Rosch, Gunter, 4,110,246, Cl. 252-301.280.
Roseberry, George Leroy, Jr.: *See*—
Grubbs, Dennis Robert; Lubsen, Timothy Andrew; and Roseberry, George Leroy, Jr., 4,110,485, Cl. 426-595.000.
Rosen, Arye; and Mykietyn, Edward, to RCA Corporation. Electronically tunable microwave frequency FET discriminator. 4,110,700, Cl. 329-103.000.
Rosenberg, Arnold Morry; and Gaidis, James Michael, to W. R. Grace & Co. Anticorrosion treatment of galvanized rebars. 4,110,120, Cl. 106-99.000.
Rosenblatt, David B.: *See*—
Korr, Abraham L.; and Rosenblatt, David B., 4,109,883, Cl. 244-3.100.
Rosendahl, Gottfried R., to United States of America, Navy. Television projector system. 4,110,791, Cl. 358-233.000.
Ross, Sidney D.; and Dunkl, Franz S., to Sprague Electric Company. Electrolytic capacitor with an electrolyte including dibasic acid compounds. 4,110,817, Cl. 361-433.000.
Rossborough, John C. Machine grooved joint on hollow concrete cylinders. 4,109,635, Cl. 125-10.000.
Rosso, John B., to Combustion Engineering, Inc. Turbine meter for bi-directional measurement of fluid flow. 4,109,526, Cl. 73-231.00R.
Rotary Power Development Limited: *See*—
Daniels, Leslie E., 4,109,618, Cl. 123-43.00C.
Roth, Philip B., to American Cyanamid Company. Process for imparting flame resistance to cellulosic textile materials and cellulosic materials obtained thereby. 4,110,599, Cl. 428-276.000.
Roto-Finish Company: *See*—
Balz, Gunther W., 4,110,085, Cl. 51-308.000.
Rotter, Gerhard; and Arns, Harold Ernest, to BASF Aktiengesellschaft. Turnaround system. 4,110,800, Cl. 360-74.000.
Rottmann, Dieter: *See*—
Klank, Otto; Rottmann, Dieter; and Wuttke, Stephan, 4,110,695, Cl. 325-464.000.
Roulleau, Pierre. Printing machine for flat articles. 4,109,572, Cl. 101-37.000.
Rovnyak, George C.; and Vogt, B. Richard, to E. R. Squibb & Sons, Inc. Pyrazolo (1,5-c) quinazoline derivatives and related compounds. 4,110,452, Cl. 424-251.000.
Roy, Amedee; Belleau, Claude; and Geyman, James M., to Chrysler Corporation. Iron oxide material and members for dry lubricated systems including the method of preparation therefor. 4,110,512, Cl. 428-469.000.
Ruckriegel, Alfred E.; and Buehler, David W., to Winzeler Stamping Company. End leaf table. 4,109,589, Cl. 108-63.000.
Ruegg, Ernst, to De Dietrich & Cie, S.A. Centrifugal filter press. 4,109,853, Cl. 233-2.000.
Ruhrchemie Aktiengesellschaft: *See*—
Berzen, Josef; and Theyssen, Johannes, 4,110,391, Cl. 264-120.000.
Rule, Charles E.; Ilagan, Juan B.; and Miller, Donald E., to SCM Corporation. Flow process for production of imitation cheese. 4,110,484, Cl. 426-582.000.
Russell, Ralph Arthur: *See*—
Castrodale, Daniel Owen; Lovgren, Jeffrey Lynn; Russell, Ralph Arthur; and Shidler, Karl Allen, 4,110,804, Cl. 360-118.000.
Rusznyak, Andreas, to Ebauches S.A. Electronic system for capacitively storing a signal voltage of predetermined level. 4,110,637, Cl. 307-238.000.
Rutgerskwerke Aktiengesellschaft: *See*—
Wilhelm, Gerhard; Hockenberger, Lothar; Soyka, Manfred; and Endruscheit, Peter, 4,110,295, Cl. 260-30.40R.
Ryobi Ltd.: *See*—
Yamasaki, Tatuya; and Sazaki, Kounin, 4,109,880, Cl. 242-84.21R.
Ryu, Ji-Yong, to UOP Inc. Oligomerization of olefins. 4,110,410, Cl. 260-683.15B.
S & F Associates: *See*—
Smith, James E., 4,109,524, Cl. 73-194.00B.

Sacarisen, David F.: *See—*
Lawford, Victor N.; and Sacarisen, David F., 4,109,531, Cl. 73-438.000.
Sacher, Reuven M.: *See—*
Franz, John E.; and Sacher, Reuven M., 4,110,100, Cl. 71-86.000.
Sachetto, Jean-Pierre: *See—*
Roman, Alain; Sachetto, Jean-Pierre; Wust, Manfred; and Cuccolo, Sergio, 4,110,112, Cl. 96-1.0PC.
Sadler, Fred S.: *See—*
Lapp, John; and Sadler, Fred S., 4,110,496, Cl. 428-500.000.
Saidman, Perry J.: *See—*
Lepore, Henry D.; and Saidman, Perry J., 4,110,734, Cl. 340-64.000.
Saikawa, Isamu; Takano, Shuntaro; Yoshida, Chosaku; Takashima, Okuta; Momonoi, Kaishu; Kuroda, Seietsu; Komatsu, Miwako; Yasuda, Takashi; and Kodama, Yutaka, to Toyama Chemical Co., Ltd. 2,3 Diketo-piperazinocarbonylamino alkanoic acids and derivatives. 4,110,327, Cl. 544-385.000.
St. Denis, Joseph F. Method for grinding thread cutting tools. 4,109,421, Cl. 51-288.000.
Saint-Gobain Industries: *See—*
Chevallier, Francois Edmond; and Fenouillet, Jean Marc Pierre, 4,110,097, Cl. 65-136.000.
Mattmuller, Rene, 4,110,098, Cl. 65-141.000.
Saito, Junichi; Kudamatsu, Akio; Kume, Toyohiko; Shiokawa, Kozo; and Tsuboi, Shinichi, to Nihon Tokushu Noyaku Seizo K.K. Pesticidal organophosphoric acid ester anhydrides. 4,110,440, Cl. 424-207.000.
Saito, Makoto, to Tomy Kogyo Co., Inc. Trackway and powered vehicle with changeable covers. 4,109,412, Cl. 46-216.000.
Saito, Shigeru. Toy motor car circuit. 4,109,410, Cl. 46-44.000.
Saitou, Masatoshi: *See—*
Ebi, Yutaka; and Saitou, Masatoshi, 4,110,031, Cl. 355-14.000.
Sakai, Fumihiko: *See—*
Umemura, Sumio; Ohdan, Kyoji; Sakai, Fumihiko; Bando, Yasuo; and Ikezawa, Harumi, 4,110,350, Cl. 260-346.750.
Sakai, Takayuki: *See—*
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Salen & Wicander Terminalsystem AB: *See—*
Johansson, Anders; and Strombeck, Per, 4,109,806, Cl. 214-38.0CC.
Salter, Edmund L., to Wind Power Systems, Inc. Wind-driven generator. 4,110,631, Cl. 290-55.000.
Salvat Dalmau, Juan; and Lecha, Manuel Julian, to Salvat Editores, S. A. Process for accelerating the drying of offset inks. 4,110,118, Cl. 106-25.000.
Salvat Editores, S. A.: *See—*
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Salzgitter Maschinen AG: *See—*
Vogel, Rudolf, 4,109,477, Cl. 61-87.000.
Samuel, Esta: *See—*
Samuel, Stanley C.; and Samuel, Esta, 4,109,794, Cl. 211-13.000.
Samuel, Stanley C.; and Samuel, Esta. Necktie rack. 4,109,794, Cl. 211-13.000.
Sander, Bruno; Bonitz, Eckhard; and Scherling, Kurt, to BASF Aktiengesellschaft. Manufacture of fibrids of polyolefins. 4,110,385, Cl. 264-13.000.
Sanders Associates, Inc.: *See—*
Chicklis, Evan P., 4,110,702, Cl. 331-94.50F.
Sandis, Stylianos; and Bailly, Jean Claude, to Naphtachimie Societe Anonyme. Manufacture of catalysts for polymerization of olefins. 4,110,248, Cl. 252-429.00B.
Sandstrom, Paul H., to Goodyear Tire & Rubber Company, The. Process for stabilizing latex and stable latices produced thereby. 4,110,293, Cl. 260-29.70R.
Sanford, Lawrence. Apparatus and method for protecting well bore. 4,109,728, Cl. 166-315.000.
Sano, Tokuo; Oshima, Takeo; and Kamata, Tokio, to Fujisawa Pharmaceutical Co., Ltd. Prophylactic, therapeutic or hygienical agent against virus diseases in fish and use therefor. 4,110,467, Cl. 424-280.000.
Sapunarov, Ivan Mitrev: *See—*
Stoev, Stoycho Mitrev; Sapunarov, Ivan Mitrev; and Manov, Emil Nikolov, 4,109,874, Cl. 241-69.000.
Sargent, Harry; and Spiegel, Si, to American Technical Institute, Inc. Hinged branch holder. 4,109,345, Cl. 16-149.000.
Sarid, Dror; and Davis, Thomas G., to Xerox Corporation. Corona device. 4,110,614, Cl. 250-324.000.
Sarkar, Arnab: *See—*
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Sarkissian, Vahe A.; Jayakumar, Nagab; Kroeger, Joseph H.; and Schlageter, Jeffrey M., to Advanced Micro Devices, Inc. Random access memory with memory status for improved access and cycle times. 4,110,842, Cl. 365-233.000.
Saroy Engineering: *See—*
Husted, Royce Hill, 4,109,739, Cl. 180-5.00R.
Sarto, Jorma O., to Chrysler Corporation. Sonic throttle for automobile. 4,110,416, Cl. 261-23.00A.
Sassmannshausen, Knut Otto. Electric incandescent lamp. 4,110,658, Cl. 313-344.000.
Sato, Fumio, to Morinaga & Co., Ltd. Method for continuously rolling up sheets of baked cookies. 4,110,482, Cl. 426-497.000.
Sato, Hiroaki: *See—*
Kunioka, Kazuo; Noguchi, Takao; and Sato, Hiroaki, 4,110,092, Cl. 62-64.000.
Sato, Kyoichi: *See—*
Hisano, Hiroshi; and Sato, Kyoichi, 4,110,821, Cl. 363-141.000.
Sato, Masamichi, to Fuji Photo Film Co., Ltd. Image forming method. 4,110,114, Cl. 96-36.000.
Sato, Mitsuru: *See—*
Teraoka, Kazuharu; Sato, Mitsuru; and Mineo, Masao, 4,109,857, Cl. 235-378.000.
Sato, Shigehiko: *See—*
Maeda, Kazuo; Noguchi, Katuichi; Kawabata, Masuo; Sato, Shigehiko; and Sato, Yukio, 4,109,663, Cl. 131-2.000.
Sato, Yasushi; and Ichihashi, Hiroo, to Canon Kabushiki Kaisha. Image transfer mechanism. 4,110,027, Cl. 355-3.0TR.
Sato, Yukio: *See—*
Maeda, Kazuo; Noguchi, Katuichi; Kawabata, Masuo; Sato, Shigehiko; and Sato, Yukio, 4,109,663, Cl. 131-2.000.
Sattin, Leone Glicerio, to Voxon S.p.A. Anti-theft alarm with coded radio link. 4,110,738, Cl. 340-539.000.
Saturn Machine & Welding Co., Inc.: *See—*
Baird, William R.; Sutton, Kenneth O.; and Baird, Billy C., 4,110,171, Cl. 202-241.000.
Satzinger, Gerhard: *See—*
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Saucy, Gabriel: *See—*
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Sauter, Daniel S.: *See—*
Zeigler, James Richard; and Sauter, Daniel S., 4,109,830, Cl. 222-143.000.
Savonuzzi, Giovanni: *See—*
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Sazaki, Kounin: *See—*
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Schacht, Erich: *See—*
Gante, Joachim; Kurmeier, Hans-Adolf; Schacht, Erich; Mehrhof, Werner; Orth, Dieter; Wild, Albrecht; and Simane, Zdenek, 4,110,447, Cl. 424-244.000.
Schaeffer, Georg: *See—*
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Schaeffer, James R.; Minsk, Louis M.; and Stevens, Richard E., to Eastman Kodak Company. Analytical element for clinical analysis. 4,110,079, Cl. 23-253.0TP.
Schaeffer, William D.; and Booth, Frank B., to Celanese Corporation. Hydrocarbonylation. 4,110,404, Cl. 260-604.0HF.
Schaffer, Dennis A., to Carmet Company. Can making. 4,109,502, Cl. 72-349.000.
Schaub, Andres; and Kogel, Gerhard, to Ciba-Geigy AG. Process for the tone-in-tone printing and pad-dyeing of textile material made from fibre mixtures. 4,110,071, Cl. 8-21.00R.
Schaub, Robert Eugene: *See—*
Floyd, Middleton Brawner, Jr.; Weiss, Martin Joseph; Poletto, John Frank; Schaub, Robert Eugene; and Bernady, Karel Francis, 4,110,368, Cl. 260-514.00D.
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Schering Corporation: *See—*
Cooper, David J.; Waitz, Jay Allan; Counelis, Mae; and Weinstein, Jay, 4,110,439, Cl. 424-181.000.
Scherling, Kurt: *See—*
Sander, Bruno; Bonitz, Eckhard; and Scherling, Kurt, 4,110,385, Cl. 264-13.000.
Scheurecker, Werner, to Vereinigte Osterreichische Eisen-und Stahlwerke - Alpine Montan Aktiengesellschaft. Arrangement for introducing a flexible starter bar into a continuous casting plant. 4,109,700, Cl. 164-426.000.
Schindler, Hans Rudolf; and Vettiger, Peter, to International Business Machines Corporation. Method and apparatus for monitoring the on/off-hook status of a telephone set. 4,110,569, Cl. 179-84.00A.
Schindler, Hermann; and Zimmermann, Wolfgang, to Hoechst Aktiengesellschaft. Process for the manufacture of films and coatings containing polyvinyl alcohol and having a reduced solubility in water. 4,110,494, Cl. 427-385.00R.
Schirmann, Peter Jude; and Blank, Werner Josef, to American Cyanamid Company. Aqueous vinyl polymeric emulsion system and process of preparing the same using aminoplast resin. 4,110,288, Cl. 260-29.4UA.
Schlageter, Jeffrey M.: *See—*
Sarkissian, Vahe A.; Jayakumar, Nagab; Kroeger, Joseph H.; and Schlageter, Jeffrey M., 4,110,842, Cl. 365-233.000.
Schleicher, George W., to Vapor Corporation. Low noise fluid distributor. 4,109,563, Cl. 98-40.00C.
Schlick, Helmut: *See—*
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Schlumberger Technology Corporation: *See—*
Tabanou, Jacques Rene, 4,110,682, Cl. 324-10.000.
Schmid, Manfred; Sommer, Werner; and Vinnemann, Antonius. Thread guidance in mesh-forming machines with rotating thread guides. 4,109,491, Cl. 66-125.00R.
Schmidt, Gunther, to Messerschmitt-Bolkow-Blohm GmbH. Liquid fuel rocket engine having adjustable nozzle throat section. 4,109,460, Cl. 60-204.000.
Schmidt, Hans: *See—*
Nakanishi, Mutsuo; and Schmidt, Hans, 4,110,721, Cl. 338-128.000.

Schmitz, Harry W.: *See*—
Fennessy, Donald W.; and Schmitz, Harry W., 4,109,373, Cl. 29-588.000.

Schmon, Franz: *See*—
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Schneider, Abraham: *See*—
Myers, Harry K., Jr.; Lyons, James E.; and Schneider, Abraham, 4,110,409, Cl. 260-666.0PY.

Schneider, Burnett M.: *See*—
Ahlgren, Richard M.; and Schneider, Burnett M., 4,110,175, Cl. 204-180.00P.

Schneider, George William, Jr., to Singer Company, The. Spider bearing support for a meter rotor. 4,109,528, Cl. 73-253.000.

Schneider, Louis, to Xerox Corporation. Drive system for multi-mode reproducing apparatus. 4,110,028, Cl. 355-8.000.

Schnell, Hans Gunther, to Van Kooten B.V. Pile-driving ram and method of controlling the same. 4,109,475, Cl. 61-53.500.

Schoeneck Farms, Inc.: *See*—
Kline, Donald C., 4,109,448, Cl. 56-13.500.

Scholl, Fred W.: *See*—
Harris, James S., Jr.; Eden, Richard C.; Cory, Earl S.; and Scholl, Fred W., 4,110,661, Cl. 313-499.000.

Scholz, Erwin, to Rollei-Werke Franke & Heidecke. Brake system for focal plane shutters of photographic cameras. 4,110,773, Cl. 354-252.000.

Schonstedt, Erick O., to Schonstedt Instrument Company. Magnetic detecting apparatus with novel means for positioning sensor assembly in a housing. 4,110,689, Cl. 324-254.000.

Schonstedt Instrument Company: *See*—
Schonstedt, Erick O., 4,110,689, Cl. 324-254.000.

Schopper, Bernd, to ITT Industries, Incorporated. Brake-force distributor for dual-circuit brake systems. 4,109,967, Cl. 303-6.00C.

Schott, Donald E., to Thomas C. Wilson, Inc. Leak detector apparatus. 4,109,513, Cl. 73-49.100.

Schreyer, Kenneth D. Folders/dividers and compartmented filing system. 4,109,982, Cl. 312-183.000.

Schroeder, Paul Robert, to Bell Telephone Laboratories, Incorporated. Level shifter and sense refresh detector. 4,110,841, Cl. 365-205.000.

Schulmeyer, Norbert: *See*—
von Bebenburg, Walter; Schulmeyer, Norbert; and Jakovlev, Vladimir, 4,110,455, Cl. 424-256.000.

Schultz, Bruce R.: *See*—
Laakaniemi, Richard N.; Ploszaj, Leon C.; and Schultz, Bruce R., 4,110,140, Cl. 156-87.000.

Schultz, Freddy R., to Aluminum Company of America. Method of forming a pressure resistant end shell for a container. 4,109,599, Cl. 113-121.00C.

Schulz, John A.: *See*—
Lenz, George R.; and Schulz, John A., 4,110,325, Cl. 260-239.55C.

Schulze, Heinz; and Waddill, Harold G., to Texaco Development Corporation. Polyether diureide epoxy additives. 4,110,309, Cl. 528-119.000.

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Schulze, Heinz; and Waddill, Harold G., to Texaco Development Corporation. Epoxy curing agent. 4,110,313, Cl. 528-90.000.

Schulze, Heinz; and Marquis, Edward T., to Texaco Development Corporation. Preparation of oxydicarboxylic acid salts. 4,110,371, Cl. 260-531.00C.

Schumacher, Georg: *See*—
Haep, Heinz; and Schumacher, Georg, 4,109,582, Cl. 102-93.000.

Schuman, Mark, to American Standard Inc. Adiabatic compression infrared emission vapor detector. 4,110,618, Cl. 250-343.000.

Schutz, Karl-Heinz; and Tesch, Karl, to Jos. Schneider & Co. Optische Werke Kreuznach. Coupling mechanism for the alternate manual and automatic adjustment of a varifocal objective. 4,110,769, Cl. 354-195.000.

Schutzenauer, Dieter: *See*—
Dyballa, Manfred; and Schutzenauer, Dieter, 4,109,517, Cl. 73-119.00A.

Schwab, Frederick C.; Sheppard, Edward W.; and Chen, Catherine S. H., to Mobil Oil Corporation. Waterflooding process employing cationic-nonionic copolymers. 4,110,232, Cl. 252-8.55B.

Schwab, James J.; and Goodson, David B., to Air Pollution Systems, Inc. Method for ionizing gases, electrostatically charging particles, and electrostatically charging particles or ionizing gases for removing contaminants from gas streams. 4,110,086, Cl. 55-7.000.

Schwabe, Ulrich: *See*—
Rathbone, Ronald; and Schwabe, Ulrich, 4,110,779, Cl. 357-34.000.

Schwartz, Peter W.: *See*—
Peterson, Glenn R.; Hicks, Marvin C.; and Schwartz, Peter W., 4,110,194, Cl. 208-11.0LE.

Schweier, Guenther; Kolk, Erich; Mueller-Tamm, Heinz; Frielingsdorf, Hans; Bachl, Robert; and Gruber, Wolfgang, to BASF Aktiengesellschaft. Manufacture of homopolymers and copolymers of $\alpha$-monoolefins. 4,110,523, Cl. 526-124.000.

Schwing, Gregory Wayne: *See*—
Fugitt, Robert Benson; and Schwing, Gregory Wayne, 4,110,473, Cl. 424-331.000.

Sciavolino, Frank C., to Pfizer Inc. Semi-synthetic oleandomycin derivatives - $C_9$ modifications. 4,110,530, Cl. 536-9.000.

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SCM Corporation: *See*—
Hodgson, Allan S.; and Red, Jerry F. P., 4,110,356, Cl. 260-412.500.
Nadkarni, Anil Vasant, 4,110,130, Cl. 148-11.50P.
Rule, Charles E.; Ilagan, Juan B.; and Miller, Donald E., 4,110,484, Cl. 426-582.000.

Scrocco, Joseph: *See*—
Cottingham, Hugh V.; and Scrocco, Joseph, 4,110,506, Cl. 428-138.000.

Sea Horse Corporation, The: *See*—
Sumner, Maurice N., 4,109,480, Cl. 61-114.000.

Sealy, Incorporated: *See*—
Klancnik, Alvin R., 4,109,330, Cl. 5-267.000.

Sebald, Franz X.; and Hagemann, Hans-Dieter, to Deutsche Texaco Aktiengesellschaft. Method of covering the bottom surface in a gas cavern. 4,109,471, Cl. 61-0.500.

Sebestyen, Ferenc: *See*—
Feuer, Laszlo; Furka, Arpad; Sebestyen, Ferenc; Hercsel nee Szepespataky, Jolan; and Bendefy nee Dobay, Erzsebet, 4,110,441, Cl. 424-211.000.

Secor, Robert Miller, to Du Pont de Nemours, E. I., and Company. Method and apparatus for encapsulating and coagulating elastomers. 4,110,491, Cl. 427-212.000.

Security Plastics, Inc.: *See*—
Kutik, Louis F.; and Cecil, Howard E., 4,109,832, Cl. 222-318.000.

Seidl, Horst: *See*—
Amann, Rolf; and Seidl, Horst, 4,109,955, Cl. 296-37.100.

Seiko Koki Kabushiki Kaisha: *See*—
Nakagawa, Tadashi; Koyama, Mitsuo; and Onda, Eiichi, 4,110,772, Cl. 354-246.000.
Onda, Eiichi; Koyama, Mitsuo; Nemoto, Ichiro; Nokagawa, Tadashi; and Watanabe, Masanori, 4,110,767, Cl. 354-152.000.

Sekhar, Neel C., to Upjohn Company, The. Process for inhibiting platelet aggregation. 4,110,161, Cl. 195-1.800.

Seki, Sanai: *See*—
Kurahashi, Takeo; Maeda, Shigeo; Seki, Sanai; Suzuki, Nobuo; and Sakai, Takayuki, 4,110,070, Cl. 8-2.50R.

Sekisui Kagaku Kogyo Kabushiki Kaisha: *See*—
Shimada, Teizo; Kita, Takeshi; Mochizuki, Kiyoshi; and Komiya, Takahiro, 4,110,394, Cl. 264-167.000.

Sekisui Kaseihin Kogyo Kabushiki Kaisha: *See*—
Ikeda, Toshiki; and Beppu, Yoshitsugu, 4,110,267, Cl. 521-59.000.

Sekiya, Kunihiko: *See*—
Kageyama, Satoshi; and Sekiya, Kunihiko, 4,110,558, Cl. 178-69.100.

Sekmakas, Kazys; and Hesler, Kenneth K., to DeSoto, Inc. Pigmented air drying latex paints having superior gloss. 4,110,292, Cl. 260-29.6RW.

Selenia-Industrie Elettroniche Associate S.p.A.: *See*—
Neri, Filippo, 4,110,752, Cl. 343-7.400.

Sellstedt, John H.; Guinosso, Charles J.; and Begany, Albert J., to American Home Products Corporation. N-(2-pyrimidinyl)1H-(or 2H)tetrazole-5-carboxamide derivatives for the prevention of immediate type hypersensitivity reactions. 4,110,453, Cl. 424-251.000.

Sellstedt, John H.; Guinosso, Charles J.; and Begany, Albert J., to American Home Products Corporation. N-(pyridyl) oxamic acid derivatives. 4,110,458, Cl. 424-263.000.

Sellstrom Manufacturing Company: *See*—
Anderson, Marshall N., 4,109,320, Cl. 2-10.000.

Selvidge, Charles W.; Morgan, Kenneth A.; and Frame, Robert R., to UOP Inc. Metal separation from dragstream material of refining process. 4,110,398, Cl. 423-62.000.

Semi-Alloys, Inc.: *See*—
Hescoe, Norman; and Levine, Samuel W., 4,109,818, Cl. 220-200.000.

Senco Products, Inc.: *See*—
Becht, Carl T., 4,109,844, Cl. 227-120.000.

Sendai, Satoshi: *See*—
Yamamoto, Hirotaka; Sendai, Satoshi; and Ninomiya, Hideaki, 4,110,260, Cl. 252-519.000.

Sendtko, Ulrich: *See*—
Mollgaard, Klaus; Keller, Hans; Sendtko, Ulrich; and Sommer, Rudiger, 4,110,826, Cl. 364-526.000.

Sentralinstitutt for Industriell Forskning: *See*—
Ersoy, Kadri Okan, 4,109,996, Cl. 350-3.660.

Serafin, Marian A.; and Decubber, Maurice, to Societe Anonyme de Traverses en Beton Arme - Systeme Vagneux. Rail spring clip with tension limiting feature. 4,109,860, Cl. 238-349.000.

Sevcon Limited: *See*—
Gurwicz, David; Sloan, Albert Everett; Moss, Barry; Wild, Arthur; and Ord, William Robert, 4,110,668, Cl. 318-78.000.

Seymour, Samuel L., to PPG Industries, Inc. Tongs for gripping glass sheets. 4,109,953, Cl. 294-118.000.

Shackle, Dale Richard: *See*—
Lee, Yu-Sun; and Shackle, Dale Richard, 4,110,511, Cl. 428-307.000.

Shaffer, Harry Leonard: *See*—
Leary, Patrick John; and Shaffer, Harry Leonard, 4,110,560, Cl. 179-1.0VC.

Shanley, James Joseph, to Bell Telephone Laboratories, Incorporated. Switching network control arrangement. 4,110,566, Cl. 179-18.0GF.

Shapiro, Eugene: *See*—
Parikh, Prakash D.; and Shapiro, Eugene, 4,110,132, Cl. 148-32.000.

Shapiro, Rosella. Scarf constructions having a substantially concealable pocket therein, and methods of producing same. 4,109,321, Cl. 2-91.000.

Shavit, Gideon, to Honeywell Inc. Load cycling with space temperature feedback. 4,110,827, Cl. 364-550.000.

Shaw, Fred B., to Continental Can Company, Inc. Sealing unit for autoclave sterilization of flexible packages. 4,109,441, Cl. 53-11.000.
Shaw, Gordon Brian; and Brinkman, Richard John, to Pickford Holland & Company Limited. Electrodes for glass furnaces. 4,110,545, Cl. 13-6.000.
Shaw, Wilfrid G.: *See—*
White, James F.; and Shaw, Wilfrid G., 4,110,369, Cl. 260-530.00N.
Shelby, Thomas A.; and Gallien, Shelby W., to Rea Magnet Wire Co., Inc. Wire enamel with low soldering temperature. 4,110,297, Cl. 260-33.40P.
Sheldon, Roger A.; Been, Peter; Wood, Derek A.; and Mason, Ronald F., to Shell Oil Company. Preparation of esters. 4,110,360, Cl. 260-465.00D.
Sheldon, Roger A.; and Been, Peter, to Shell Oil Company. Preparation of esters. 4,110,361, Cl. 260-465.00D.
Sheldon, Roger A.; and Been, Peter, to Shell Oil Company. Preparation of esters. 4,110,362, Cl. 260-465.00D.
Sheldon, Roger A.; and Been, Peter, to Shell Oil Company. Preparation of esters. 4,110,363, Cl. 260-465.00D.
Shell Oil Company: *See—*
Gergen, William P.; and Davison, Sol, 4,110,303, Cl. 260-42.180.
Gwyn, John E.; and Roberts, Scott C., 4,110,193, Cl. 208-11.00R.
Sheldon, Roger A.; Been, Peter; Wood, Derek A.; and Mason, Ronald F., 4,110,360, Cl. 260-465.00D.
Sheldon, Roger A.; and Been, Peter, 4,110,361, Cl. 260-465.00D.
Sheldon, Roger A.; and Been, Peter, 4,110,362, Cl. 260-465.00D.
Sheldon, Roger A.; and Been, Peter, 4,110,363, Cl. 260-465.00D.
Shelton, James B.: *See—*
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Shemer, Jack E.: *See—*
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Shepard, Inella Gatlin: *See—*
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Sheppard, Edward W.: *See—*
Schwab, Frederick C.; Sheppard, Edward W.; and Chen, Catherine S. H., 4,110,232, Cl. 252-8.55B.
Sheratte, Martin B., to McDonnell Douglas Corporation. Process for converting the decomposition products of polyurethane and novel compositions thereby obtained. 4,110,266, Cl. 260-2.300.
Sheridan, David S., to Mallinckrodt, Inc. Evagination catheters. 4,109,659, Cl. 128-349.00R.
Sheridan, Geoffrey Philip: *See—*
Tennant, David John; Sheridan, Geoffrey Philip; and Steel, Alistair James, 4,110,213, Cl. 210-59.000.
Shibata, Hiroshi; and Yoshihara, Tsutomu, to Mitsubishi Denki Kabushiki Kaisha. Process for preparing insulated gate semiconductor. 4,109,371, Cl. 29-571.000.
Shibata, Toshihiro: *See—*
Minagawa, Motonobu; Kubota, Naohiro; and Shibata, Toshihiro, 4,110,306, Cl. 260-45.80N.
Shidler, Karl Allen: *See—*
Castrodale, Daniel Owen; Lovgren, Jeffrey Lynn; Russell, Ralph Arthur; and Shidler, Karl Allen, 4,110,804, Cl. 360-118.000.
Shigemori, Shuichiro: *See—*
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Shih, Pong Su: *See—*
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Shimada, Teizo; Kita, Takeshi; Mochizuki, Kiyoshi; and Komiya, Takahiro, to Sekisui Kagaku Kogyo Kabushiki Kaisha. Process for extrusion forming of resin formed body having different thickness. 4,110,394, Cl. 264-167.000.
Shimizu, Masatoshi: *See—*
Miyazaki, Togo; and Shimizu, Masatoshi, 4,110,663, Cl. 315-169.0TV.
Shimizu, Teruo: *See—*
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Shimizu, Yoshiteru: *See—*
Onodera, Hisakichi; Suwa, Masateru; Onuki, Jin; and Shimizu, Yoshiteru, 4,110,783, Cl. 357-67.000.
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Shinohara, Shigeyuki; and Makino, Hiroshi. Parallel indexing cam structure. 4,109,548, Cl. 74-569.000.
Shinshu Seiki Kabushiki Kaisha: *See—*
Usui, Kiyofumi; Hirabayashi, Shigeyoshi; and Hosogaya, Hiroshi, 4,109,843, Cl. 226-109.000.
Shiokawa, Kozo: *See—*
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Shiraki, Masao: *See—*
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Kobayashi, Akira; Chiba, Kunji; Miyamoto, Noriaki; Shiraki, Masao; and Furukawa, Naotake, 4,109,453, Cl. 57-58.910.
Shirashoji, Hishashi: *See—*
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Shiseido Co., Ltd.: *See—*
Katada, Michihisa; Hayashi, Katsutake; Katsura, Hakuji; Tomita, Kenichi; Morohoshi, Hideo; Uehara, Keiichi; and Tanaka, Hiroshi, 4,110,626, Cl. 252-522.000.
Shishido, Toetsu: *See—*
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Shoor, Bernard A.: *See—*
Haynes, John L.; and Shoor, Bernard A., 4,110,604, Cl. 235-92.0PC.
Shuff, Gregory Douglas. Inflatable swimming pool cover system. 4,109,325, Cl. 4-172.120.
Shulman, Michael H. Overhead load-wrapping apparatus. 4,109,445, Cl. 53-198.00R.
Shumway, Durland Karl: *See—*
Barnhurst, James Douglas; and Shumway, Durland Karl, 4,110,426, Cl. 424-46.000.
Sichel, Enid Keil, to RCA Corporation. Electrochromic cermet material and device including the same. 4,110,259, Cl. 252-514.000.
Sickles, Doris E.: *See—*
Numbers, Jody L., 4,110,021, Cl. 353-27.00R.
Sickles, Ralph A.: *See—*
Numbers, Jody L., 4,110,021, Cl. 353-27.00R.
Sieber, Felix P., to BCS Mach. & Mfg. Corp. Bracket assembly for mounting a CB antenna. 4,110,757, Cl. 343-715.000.
Sieck, Charles A. Heating system. 4,109,486, Cl. 62-402.000.
Siemens Aktiengesellschaft: *See—*
Deckert, Andreas; and Wolscheck, Hans, 4,110,816, Cl. 361-433.000.
Rathbone, Ronald; and Schwabe, Ulrich, 4,110,779, Cl. 357-34.000.
Zottl, Anton, 4,110,755, Cl. 343-17.2PC.
Sieving, Alfred W.; and Stanley, James M., to Caterpillar Tractor Co. Dump body gate latch control system. 4,109,963, Cl. 298-23.00M.
Sifferman, Thomas R.; and Sparlin, Derry D., to Continental Oil Company. Control of incompetent formations with thickened acid-settable resin compositions. 4,110,275, Cl. 260-14.000.
SIG Schweizerische Industrie-Gesellschaft: *See—*
Egli, Alwin, 4,109,822, Cl. 220-404.000.
Sigmatex, A.G.: *See—*
Weman, Per Olof, 4,109,935, Cl. 280-747.000.
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Silver Seiko Ltd.: *See—*
Iwasaki, Yasuhiro, 4,109,489, Cl. 66-75.200.
Silverberg, Morton, to Xerox Corporation. Optical system for alternatively projecting adjacent images of adjacent objects or double images of a single object. 4,110,023, Cl. 353-122.000.
Silvestrini, Jesus Antonio, to California Processing Machinery. Apparatus for pitting peaches. 4,109,570, Cl. 99-551.000.
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Singer Company, The: *See—*
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Albert, William Charles, 4,109,534, Cl. 73-503.000.
Beer, Emmanuel Emil, 4,110,609, Cl. 250-231.00R.
Fahey, William David, 4,110,737, Cl. 340-146.30Q.
Rakacs, Joseph G., 4,109,591, Cl. 112-76.000.
Schneider, George William, Jr., 4,109,528, Cl. 73-253.000.
Vermillion, Don W., 4,109,342, Cl. 15-373.000.
Singer, Malcolm S., to Chevron Research Company. Cellulose fermentation process. 4,110,475, Cl. 426-2.000.
Sirven, Jacques, to Thomson-CSF. Device for processing signals from a coherent pulse radar. 4,110,753, Cl. 343-8.000.
Six, Ludwig, to Mauser-Werke Aktiengesellschaft. Projectile for an infantry rifle. 4,109,581, Cl. 102-92.100.
Skidmore, Richard H., to Welding Engineers, Inc. Pressure restricting means for a liquid outlet of an extruder. 4,110,843, Cl. 366-83.000.
Skilling, John B.: *See—*
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Skipsaksjeselskapet Suderoy: *See—*
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Skogman, Richard A.: *See—*
Chaffin, John H., III; and Skogman, Richard A., 4,110,489, Cl. 427-164.000.

Skrovanek, Ambroz Karol: *See—*
Gaetano, Mauro Luigi; and Skrovanek, Ambroz Karol, 4,110,711, Cl. 333-32.000.

Slagel, Roger D. Combination check flow control and selector valve. 4,109,670, Cl. 137-119.000.

Sleath, William Derek: *See—*
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Sloan, Albert Everett: *See—*
Gurwicz, David; Sloan, Albert Everett; Moss, Barry; Wild, Arthur; and Ord, William Robert, 4,110,668, Cl. 318-78.000.

Sloan, Cephas H.; and Pacifici, James G., to Eastman Kodak Company. Ultraviolet curable polyester binder and coating formulation. 4,110,187, Cl. 204-159.190.

Sloan Valve Company: *See—*
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Sluse, Guy; and Dujardin, Francois, to Solvay & Cie. Method of handling aqueous solutions of alkali metal hydroxides that are concentrated in respect of alkali metal halides. 4,110,181, Cl. 204-147.000.

Slusser, Marion L., to Mobil Oil Corporation. Method of proppant placement in hydraulic fracturing treatment. 4,109,721, Cl. 166-280.000.

Small, Richard B., to Texas Instruments Incorporated. Thermal printhead assembly. 4,110,598, Cl. 219-216.000.

Smart, William A., Jr.; and Gumm, Scott H., to Bradley Corporation. Remote actuated metering valve. 4,109,895, Cl. 251-41.000.

Smirnov, Alexandr Stepanovich: *See—*
Vorona, Dmitry Afanasievich; Chikul, Vitaly Ivanovich; Smirnov, Alexandr Stepanovich; Chikul, Olga Semenovna; Yagunov, Boris Ivanovich; Tager, Semen Alexandrovich; Shipkov, Nikolai Nikolaevich; Perepelkin, Arkady Vitalievich; Grigorieva, Elizaveta Alexeevna; Krasnovsky, Gennady Alexeevich, deceased; and Krasnovskaya, Tatyana Sergeevna, administratrix, 4,110,064, Cl. 431-171.000.

Smith, Bob Lorin, deceased: *See—*
Berg, Norman J.; Smith, Bob Lorin, deceased; and Adams, Allen B., legal representative, 4,110,016, Cl. 350-358.000.

Smith, Charles R., to Cutler-Hammer, Inc. Thermostatic control. 4,110,720, Cl. 337-319.000.

Smith, Clifford E.; and Holtz, Hans D., to Phillips Petroleum Company. Catalytically active $AlCl_3$-graphite intercalate. 4,110,252, Cl. 252-442.000.

Smith, Donald Luke: *See—*
Farley, Ronald William; and Smith, Donald Luke, 4,110,026, Cl. 355-3.00R.

Smith, Donald V. Externally mountable, high strength, security lock for doors and the like. 4,109,949, Cl. 292-189.000.

Smith, Eugene Leroy, Jr.: *See—*
Wang, Samuel Shan Ning; and Smith, Eugene Leroy, Jr., 4,110,207, Cl. 209-166.000.

Smith, Frank F.: *See—*
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Smith, Irl Wilson, Jr.; and Dorschner, Terry A., to Raytheon Company. Electromagnetic wave ring resonator. 4,110,045, Cl. 356-106.0LR.

Smith, James E., to S & F Associates. Method and apparatus for mass flow rate measurement. 4,109,524, Cl. 73-194.00B.

Smith, Kenneth J.; and Anderson, Jerry F. Bow sight. 4,109,390, Cl. 33-265.000.

Smith, Lynwood L. Solar heating system. 4,109,640, Cl. 126-271.000.

Smith, Richard E.: *See—*
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Smith, Roger, Jr.: *See—*
Howard, James A.; and Smith, Roger, Jr., 4,109,800, Cl. 214-2.500.

Smith, William Allen: *See—*
Stalling, David L.; Huckins, James N.; and Smith, William Allen, 4,110,344, Cl. 260-340.300.

Sneed, James W., Jr. Dual threshold logic probe. 4,110,687, Cl. 324-133.000.

Snyder, Clair Wilson, Jr.; and Derr, Paul Birchard, to AMP Incorporated. Environmentally sealed electrical connector. 4,109,989, Cl. 339-94.00M.

Snyder Manufacturing Co., Ltd.: *See—*
Hoel, Steven Michael, 4,110,497, Cl. 428-190.000.

Sobieski, John C., to General Electric Company. Lead-in seal and lamp utilizing same. 4,110,657, Cl. 313-332.000.

Societa Italiana Telecommunicazioni Siemens S.p.A.: *See—*
Ratti, Franco; Vivarelli, Gianantonio; Maganza, Dario; and D'Amore, Emanuele, 4,109,379, Cl. 29-747.000.

Societe Anonyme Automobile Citroen: *See—*
Estaque, Andre Fernand, 4,109,979, Cl. 308-238.000.

S.A. Block & Concrete (Proprietary) Limited: *See—*
Pfeffer, Johann Baptist, 4,110,214, Cl. 210-77.000.

Societe Anonyme D.B.A.: *See—*
Carre, Jean-Jacques, 4,109,764, Cl. 188-72.400.

Societe Anonyme de Traverses en Beton Arme - Systeme Vagneux: *See—*
Serafin, Marian A.; and Decubber, Maurice, 4,109,860, Cl. 238-349.000.

S.A. des Anciens Etablissements Paul Wurth: *See—*
Legille, Edouard, 4,110,617, Cl. 250-342.000.

s.a. Texaco Belgium n.v.: *See—*
Dewaele, Sylvain A. R., 4,110,323, Cl. 260-239.30A.

Societe Chimique des Charbonnages: *See—*
Hubert, Jacques; Ory, Jean-Marie; Bottin, Jean; and Humbert, Claude, 4,110,741, Cl. 340-573.000.

Societe dite Automobiles Peugeot: *See—*
Rivere, Jean Pierre, 4,109,669, Cl. 137-101.190.

Societe E. Lacroix: *See—*
Denninger, Claude, 4,109,406, Cl. 43-84.000.

Societe Lignes Telegraphiques et Telephoniques: *See—*
Frade, Gilbert; Escher, Balint; and Prince, Dominique, 4,110,815, Cl. 361-433.000.

Societe Nationale Elf Aquitaine (Production): *See—*
Godeau, Alain; and Heas, Jean-Yves, 4,109,479, Cl. 61-94.000.

Societe pour l'Etude et la Fabrication de Circuits Integres Speciaux: *See—*
Tigreat, Paul, 4,110,762, Cl. 354-4.000.

Societe RHONE-PROGIL: *See—*
Botton, Roger Jean, 4,110,423, Cl. 423-356.000.

Sogemaric, Societe de Gestion et de Marketing pour Industries de Consommation: *See—*
Denninger, Claude, 4,109,406, Cl. 43-84.000.

Sohngen, Edwin Lowe: *See—*
Goethel, James Herbert; and Sohngen, Edwin Lowe, 4,109,656, Cl. 128-266.000.

Sola Basic Industries, Inc.: *See—*
Pennings, Matheus D.; and Tippin, Billy B., 4,109,846, Cl. 228-4.500.

Solar Suede Corporation: *See—*
McHugh, John P., 4,109,861, Cl. 239-15.000.

Soldner, Richard: *See—*
Hetz, Walter; and Soldner, Richard, 4,110,723, Cl. 340-1.00R.

Soles, Otto H.: *See—*
Freeman, Willie B.; Yeckley, Russell N.; Soles, Otto H.; and Telford, James M., 4,110,578, Cl. 200-148.00F.

Solt, Paul E.: *See—*
Boyhont, Donald S.; and Solt, Paul E., 4,109,966, Cl. 302-50.000.

Solvay & Cie: *See—*
Sluse, Guy; and Dujardin, Francois, 4,110,181, Cl. 204-147.000.

Soma, Kazuhiko: *See—*
Ichikawa, Yataro; Kobayashi, Osamu; Soma, Kazuhiko; Naruchi, Tatuyuki; Yamanaka, Yoshiyuki; and Suzuki, Nobuo, 4,110,403, Cl. 260-603.00R.

Sommer, Rudiger: *See—*
Mollgaard, Klaus; Keller, Hans; Sendtko, Ulrich; and Sommer, Rudiger, 4,110,826, Cl. 364-526.000.

Sommer, Werner: *See—*
Schmid, Manfred; Sommer, Werner; and Vinnemann, Antonius, 4,109,491, Cl. 66-125.00R.

Sony Corporation: *See—*
Hongu, Masayuki; Tokuhara, Masaharu; and Kawakami, Hiromi, 4,110,635, Cl. 307-233.00R.

Souder, James J., Jr.; and Waidorf, Lindsey E., to Patents Licensing International, Ltd. Method and apparatus for heating food. 4,110,587, Cl. 219-10.49R.

Soudure Autogene Francaise: *See—*
Martin, Philippe, 4,109,922, Cl. 277-34.300.

Southgate, Malcolm Dennis: *See—*
Harrison, Peter Arthur; Parks, Anthony John; Southgate, Malcolm Dennis; Sleath, William Derek; and Hills, Richard Keith, 4,110,037, Cl. 355-48.000.

Soyka, Manfred: *See—*
Wilhelm, Gerhard; Hockenberger, Lothar; Soyka, Manfred; and Endruscheit, Peter, 4,110,295, Cl. 260-30.40R.

Spanel, Abram N.; Eiland, P. Frank; Jacobs, David R.; and Ziegler, Geza C., to Spanel, Abram N. Tufting machine malfunction detection device. 4,109,594, Cl. 112-79.00R.

Sparlin, Derry D.: *See—*
Sifferman, Thomas R.; and Sparlin, Derry D., 4,110,275, Cl. 260-14.000.

Spaziante, Placido M.: *See—*
Nidola, Antonio; De Nora, Vittorio; and Spaziante, Placido M., 4,110,180, Cl. 204-128.000.

Spears, John F., Jr., to UOP Inc. Solar energy collecting pond. 4,110,172, Cl. 202-234.000.

Specht, Steven J.; and Adams, John O., to Olin Corporation. Separator-electrode unit for electrolytic cells. 4,110,191, Cl. 204-266.000.

Spector, George: *See—*
Brockman, Gary; McFadden, Hubert J.; and Spector, George, 4,109,980, Cl. 312-35.000.

Spence, Eion Murray: *See—*
Kemp, Grey Charles; and Spence, Eion Murray, 4,110,650, Cl. 310-239.000.

Spencer, David R., to Litton Systems, Inc. Method of graphic data redundancy reduction in an optical facsimile system. 4,110,795, Cl. 358-260.000.

Spencer, Merrill P.: *See—*
Reid, John M.; and Spencer, Merrill P., 4,109,642, Cl. 128-2.00V.

Sperry Rand Corporation: *See—*
Huber, W. Donald, 4,110,557, Cl. 178-69.100.
Miller, Harry, 4,110,605, Cl. 364-463.000.
Tribken, Everett R.; Miller, Ronald J.; and Griffith, Carl D., 4,109,886, Cl. 244-178.000.
Wing, Willis G., 4,109,391, Cl. 33-275.00G.

Spethmann, Donald H., to Honeywell Inc. Heating and cooling cost minimization. 4,109,704, Cl. 165-16.000.

Spiegel, Si: *See—*
Sargent, Harry; and Spiegel, Si, 4,109,345, Cl. 16-149.000.

Spisak, Edward G. Welding machine. 4,110,577, Cl. 219-101.000.

Spivey, Paul Richard: *See—*
Hubbard, James Henry; Hubert, Wallace Lloyd; and Spivey, Paul Richard, 4,110,032, Cl. 355-14.000.

Spotts, Willard J.; and Huggler, Peter E., to McGraw-Edison Company. Thermostatically controlled plural heat output portable electric space heater. 4,110,600, Cl. 219-364.000.

Sprague Electric Company: *See—*
Ross, Sidney D.; and Dunkl, Franz S., 4,110,817, Cl. 361-433.000.

Staar, Marcel Jules Helene, to Staar S.A. Intermittent drive mechanism for film. 4,110,019, Cl. 352-188.000.

Staar S.A.: *See—*
Staar, Marcel Jules Helene, 4,110,019, Cl. 352-188.000.

Stacey Manufacturing Co., The: *See—*
Kushman, Robert L.; and Ling, Sumy H. C., 4,109,819, Cl. 220-208.000.

Stach, Leonard J.; Hotz, Roger D.; and Richter, Sidney B., to Velsicol Chemical Corporation. Dioxepane substituted amides. 4,110,101, Cl. 71-88.000.

Stache, Helmut: *See—*
Graf, Richard; Brodzina, Lieselotte; Strobele, Rudolf; and Stache, Helmut, 4,110,075, Cl. 8-137.000.

Stackpole Carbon Company: *See—*
Quirk, Virgil P., 4,109,667, Cl. 132-33.00R.

Stahl, John Edvard Lennart, to Tornborg & Lundberg AB. Hoisting crane for building purposes. 4,109,681, Cl. 137-615.000.

Stahler, Gerhard: *See—*
Mildenberger, Hilmar; Stahler, Gerhard; and Emmel, Ludwig, 4,110,336, Cl. 260-307.00G.

Stalling, David L.; Huckins, James N.; and Smith, William Allen, to United States of America, Interior. Adsorbent for polynuclear aromatic compounds. 4,110,344, Cl. 260-340.300.

Stamper, Robert L.: *See—*
Becker, Bernard; Stamper, Robert L.; Asseff, Carl F.; and Podos, Steven M., 4,110,461, Cl. 424-273.00R.

Stanczak, John S.: *See—*
Rao, G. R. Mohan; Stanczak, John S.; Lien, Jih-Chang; and Bhatia, Shyam, 4,110,776, Cl. 357-23.000.

Standard Brands Incorporated: *See—*
Sutthoff, Robert F.; MacAllister, Robert V.; and Khaleeluddin, Khaja, 4,110,164, Cl. 195-63.000.

Standard Oil Company, The: *See—*
White, James F.; and Shaw, Wilfrid G., 4,110,369, Cl. 260-530.00N.

Standard Oil Company (Indiana): *See—*
Cagle, William S., 4,110,225, Cl. 252-8.5LC.

Standard Pressed Steel Co.: *See—*
Boys, John T., 4,110,829, Cl. 364-577.000.

Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., to Xerox Corporation. Fluidic feeding of documents to an exposure station. 4,109,903, Cl. 271-3.000.

Stanley, James M.: *See—*
Sieving, Alfred W.; and Stanley, James M., 4,109,963, Cl. 298-23.00M.

Stannett, Vivian: *See—*
Williams, Joel; Dunn, Terry; and Stannett, Vivian, 4,110,185, Cl. 204-159.200.

Star Manufacturing Company of Oklahoma: *See—*
Hedges, William C., 4,110,280, Cl. 264-22.000.

Starks, Charles M.: *See—*
Goodwin, Thomas E.; and Starks, Charles M., 4,110,543, Cl. 568-781.000.
Goodwin, Thomas E.; and Starks, Charles M., 4,110,544, Cl. 568-805.000.

Static Systems Corporation: *See—*
Lester, Robert W.; and Hotto, Robert, 4,110,794, Cl. 358-256.000.

Stauffer Chemical Company: *See—*
Teach, Eugene G., 4,110,105, Cl. 71-95.000.

Stautzenberger, Adin Lee: *See—*
Wells, William J., III; and Stautzenberger, Adin Lee, 4,110,298, Cl. 260-340.000.

Steel, Alistair James: *See—*
Tennant, David John; Sheridan, Geoffrey Philip; and Steel, Alistair James, 4,110,213, Cl. 210-59.000.

Steidinger, Donald J., to Wallace Business Forms, Inc. Method of producing form suitable for airline ticketing. 4,109,936, Cl. 282-11.50A.

Steigerwald, Allan M. Anesthetic gas exhaust system. 4,109,651, Cl. 128-145.800.

Steinfatt, Fritz: *See—*
Hopp, Rudolf; Sturm, Wolfgang; and Steinfatt, Fritz, 4,110,430, Cl. 424-65.000.

Stengle, Edward J., Jr., to Owens-Illinois, Inc. Manufacture of glass wherein hot metal molds are provided with a solid film lubricant layer. 4,110,095, Cl. 65-26.000.

Stenkvist, Sven-Einar, to ASEA Aktiebolag. DC arc furnace having a rotating arc. 4,110,546, Cl. 13-11.000.

Stenlund, Hans, to Gotaverken Angteknik AB. Fuel supply governing device. 4,109,868, Cl. 239-413.000.

Stenudd, Sven Gunnar Valter: *See—*
Ek, Birger Henrik; and Stenudd, Sven Gunnar Valter, 4,109,776, Cl. 400-124.000.

Step-Rite Limited: *See—*
Andruchiw, Roman, 4,109,740, Cl. 180-8.00A.

Stephan, Gerard, to Nadella. Resiliently mounted radial and axial bearings. 4,109,977, Cl. 308-174.000.

Stephens, Geoffrey Brownell: *See—*
Bergeron, David Leo; Putney, Zimri Congdon; and Stephens, Geoffrey Brownell, 4,110,126, Cl. 148-1.500.

Sterling, Warren M.: *See—*
Cronshaw, David; Shemer, Jack E.; Turner, William D.; Hartke, David; Keddy, James R.; DuVall, Wilbur E.; and Sterling, Warren M., 4,110,823, Cl. 364-200.000.

Stern, Michael D.; and Lappe, Donald L., to United States of America, Health, Education and Welfare. Method of and apparatus for measurement of blood flow using coherent light. 4,109,647, Cl. 128-2.05F.

Sterndent Corp.: *See—*
Zahn, Eric H.; and Martin, Philip W., 4,109,385, Cl. 32-59.000.

Stevens, Charles G., to United States of America, Energy. Isotope separation by photoselective dissociative electron. 4,110,182, Cl. 204-157.10R.

Stevens, Richard E.: *See—*
Schaeffer, James R.; Minsk, Louis M.; and Stevens, Richard E., 4,110,079, Cl. 23-253.0TP.

Stevenson, Basil Charles James, to Westland Aircraft Limited. Fibre reinforced plastics structure. 4,110,056, Cl. 416-230.000.

Stewart, John K., to Canron, Inc. Needle indicator for rail liner. 4,109,388, Cl. 33-287.000.

Stewart, Maurice M., to Oxygen Therapy Institute, Inc. Inhalation apparatus. 4,109,828, Cl. 222-3.000.

Stifano, Joseph Michael, to International Paper Company. Self-threading container closure and method thereof. 4,109,820, Cl. 220-240.000.

Stillwagon, Roy E., to United States of America, Energy. Homopolar machine for reversible energy storage and transfer systems. 4,110,648, Cl. 310-178.000.

Stinchfield, Lawrence M. Legless rocker-recliner chair. 4,109,960, Cl. 297-258.000.

Stoev, Stoycho Mitrev; Sapunarov, Ivan Mitrev; and Manov, Emil Nikolov, to Vish Minno-Geloshki Institute-Nis Darvenitza. Apparatus for mineral processing. 4,109,874, Cl. 241-69.000.

Stokke Fabrikker A/S: *See—*
Opsvik, Peter, 4,109,961, Cl. 297-338.000.

Stoneburner, Leonard G., to Mead Corporation, The. Orifice plate holder for a fluid jet printing apparatus. 4,110,759, Cl. 346-75.000.

Stoss, Peter; Satzinger, Gerhard; and Herrmann, Manfred, to Warner-Lambert Company. Tricyclic sulphoximides in pharmaceutical compositions and methods. 4,110,448, Cl. 424-247.000.

Stothert & Pitt Limited: *See—*
Comyns-Carr, Cecil Alastair, 4,109,798, Cl. 212-39.00R.

Stotz, Wolf-Gunter; and Hund, Helmut, to Escher Wyss Limited. Compact press at the web transfer position of a paper making machine. 4,110,156, Cl. 162-305.000.

Stoy, Vladimir, to Ceschoslovak akademie ved. Method of manufacturing spherical polymer particles from polymer solutions. 4,110,529, Cl. 528-491.000.

Strache, Wilhelm, to Gestra-KSB Vertriebsgesellschaft. Throttle valve. 4,109,683, Cl. 137-625.300.

Stratoflex, Inc.: *See—*
Cooke, Horise M., 4,109,943, Cl. 285-149.000.

Strauch, Karl; and Kammann, Wilfried, to Werner Kamman Maschinenfabrik. Article, screen and squeegee drive for screenprinter. 4,109,573, Cl. 101-38.00R.

Streeter, Walter E., to Mayes Brothers Tool Manufacturing Co. Pocket level. 4,109,392, Cl. 33-381.000.

Stricharczuk, Paul Thomas: *See—*
Lindsay, Geoffrey Andrew; and Stricharczuk, Paul Thomas, 4,110,414, Cl. 260-897.00A.

Strobele, Rudolf: *See—*
Graf, Richard; Brodzina, Lieselotte; Strobele, Rudolf; and Stache, Helmut, 4,110,075, Cl. 8-137.000.

Strombeck, Per: *See—*
Johansson, Anders; and Strombeck, Per, 4,109,806, Cl. 214-38.0CC.

Strong, Richard I., to Northwest Engineering Company. Safety lockout for engine clutch. 4,109,771, Cl. 192-83.000.

Strozier, Robert E., to Lawrence Brothers, Inc. Pivot and support mounting assembly. 4,109,346, Cl. 16-151.000.

Strupczewski, Joseph T.: *See—*
Helsley, Grover C.; Strupczewski, Joseph T.; and Gardner, Beth Ann, 4,110,459, Cl. 424-267.000.

Strybel, Richard V. Fluid test device. 4,109,536, Cl. 73-756.000.

Strycker, Wallace G.: *See—*
Havera, Herbert J.; and Strycker, Wallace G., 4,110,536, Cl. 544-139.000.

Stucke, Charles G., to Chemprene, Inc. Stepped joint piston ring. 4,109,924, Cl. 277-165.000.

Stucky, James L. Trailer with lowerable bed. 4,109,811, Cl. 214-506.000.

Stump, Theodore M.: *See—*
May, Peter J.; and Stump, Theodore M., 4,110,563, Cl. 179-15.0BW.

Sturm, Warren A.: *See—*
Wilhelm, Gary L., 4,110,694, Cl. 325-464.000.

Sturm, Wolfgang: *See—*
Hopp, Rudolf; Sturm, Wolfgang; and Steinfatt, Fritz, 4,110,430, Cl. 424-65.000.

Styfhoorn, John: *See—*
Ostrowski, Richard C.; and Styfhoorn, John, 4,110,150, Cl. 156-499.000.

Sugawara, Yoshitaka: *See*—
Konishi, Nobutake; Yokota, Takeshi; Sugawara, Yoshitaka; Yatsuo, Tsutomu; and Okamura, Masahiro, 4,110,781, Cl. 357-39.000.
Sugino, Takayuki. Wheel stop apparatus. 4,109,763, Cl. 188-32.000.
Sugita, Hiroaki: *See*—
Inoue, Takehisa; Ogawa, Yutaka; Sugita, Hiroaki; and Watanabe, Namio, 4,109,766, Cl. 188-73.400.
Sugitawa, Chikara: *See*—
Imanaka, Hiroshi; Kijima, Yoshihiko; Sugitawa, Chikara; and Sumoto, Misao, 4,110,411, Cl. 260-873.000.
Sugiyama, Kengo: *See*—
Matsuoka, Noboru; and Sugiyama, Kengo, 4,109,387, Cl. 33-185.00V.
Sugiyama, Masatoshi; and Kato, Eiichi, to Fuji Photo Film Co., Ltd. Photographic light-sensitive element having dyed layer. 4,110,115, Cl. 96-84.00A.
Sukornick, Bernard: *See*—
Anello, Louis G.; Sweeney, Richard F.; and Sukornick, Bernard, 4,110,407, Cl. 260-653.400.
Sullivan Company: *See*—
Cunningham, William E., 4,109,484, Cl. 62-256.000.
Sumitomo Chemical Company, Limited: *See*—
Hamada, Takaki; Kanazawa, Hiroyuki; and Yanase, Masataka, 4,110,526, Cl. 526-214.000.
Inoue, Satoru; Uematsu, Tamon; and Yamashita, Norihisa, 4,110,466, Cl. 424-274.000.
Kojima, Atsuyuki; Katsube, Junki; Kameno, Yoshito; Inaba, Shigeho; and Yamamoto, Hisao, 4,110,376, Cl. 260-570.00R.
Takayama, Chiyozo; Yamamoto, Shigeo; Kato, Toshiro; Hisada, Yoshio; and Fujinami, Akira, 4,110,462, Cl. 424-273.00R.
Sumitomo Rubber Industries, Ltd.: *See*—
Nakasaki, Eiji; and Shirashoji, Hishashi, 4,109,696, Cl. 152-354.00R.
Summers, Charles Donovan. Reference index for instrument dials. 4,109,607, Cl. 116-129.00A.
Summers, James William, to B. F. Goodrich Company, The. Processing extruded vinyl siding. 4,110,062, Cl. 425-71.000.
Sumner, Maurice N., to Sea Horse Corporation, The. Under water crane. 4,109,480, Cl. 61-114.000.
Sumoto, Misao: *See*—
Imanaka, Hiroshi; Kijima, Yoshihiko; Sugitawa, Chikara; and Sumoto, Misao, 4,110,411, Cl. 260-873.000.
Sun Oil Company of Pennsylvania: *See*—
Bramlett, David A., 4,110,215, Cl. 210-114.000.
Suntech, Inc.: *See*—
Angstadt, Howard P., 4,110,250, Cl. 252-432.000.
Lagow, Richard J.; Shimp, Lawrence A.; and Clark, Leland C., Jr., 4,110,474, Cl. 424-350.000.
Myers, Harry K., Jr.; Lyons, James E.; and Schneider, Abraham, 4,110,409, Cl. 260-666.0PY.
Sutthoff, Robert F.; MacAllister, Robert V.; and Khaleeluddin, Khaja, to Standard Brands Incorporated. Agglomerated fibrous cellulose. 4,110,164, Cl. 195-63.000.
Sutton, Kenneth O.: *See*—
Baird, William R.; Sutton, Kenneth O.; and Baird, Billy C., 4,110,171, Cl. 202-241.000.
Suwa, Masateru: *See*—
Onodera, Hisakichi; Suwa, Masateru; Onuki, Jin; and Shimizu, Yoshiteru, 4,110,783, Cl. 357-67.000.
Suzuki, Gyoichi; Moriguchi, Sanseki; Miyazu, Takashi; Okuyama, Yasuo; Muroya, Masahiro; Yanagiuchi, Mamoru; Mori, Takashi; and Miura, Mitsutoshi, to Nippon Kokan Kabushiki Kaisha. Method for manufacturing high-strength formed coke in slight mutual agglomeration using horizontal type coke oven battery. 4,110,169, Cl. 201-6.000.
Suzuki, Kazuhiro: *See*—
Gaku, Morio; Suzuki, Kazuhiro; and Nakamichi, Kazuyuki, 4,110,364, Cl. 528-170.000.
Suzuki, Keiichi; Takahashi, Keikichi; Matsuura, Eiichi; and Harada, Akinobu, to Kabushiki Kaisha Daini Seikosha. Date and day correcting device of a timepiece. 4,109,458, Cl. 58-63.000.
Suzuki, Masanori: *See*—
Matsushima, Yasunobu; Yashiro, Kuniji; Kaneko, Hideaki; and Suzuki, Masanori, 4,110,129, Cl. 148-6.15R.
Suzuki Metal Industrial Co, Ltd.: *See*—
Honda, Ichiro; Takasu, Shigetoshi; and Onuki, Yoshio, 4,109,709, Cl. 165-105.000.
Suzuki, Minoru, to Ricoh Company, Ltd. Drum cleaning apparatus for electrostatic copying machine. 4,110,034, Cl. 355-15.000.
Suzuki, Motoaki: *See*—
Koshiga, Fusao; Tanaka, Jinkichi; Watanabe, Itaru; Suzuki, Motoaki; Kojima, Toshifumi; Matsubara, Hiroyoshi; Osuka, Tatsumi; Takeshige, Kenji; Nagamine, Takashi; and Hirano, Osamu, 4,110,589, Cl. 219-66.000.
Suzuki, Nobuo: *See*—
Ichikawa, Yataro; Kobayashi, Osamu; Soma, Kazuhiko; Naruchi, Tatuyuki; Yamanaka, Yoshiyuki; and Suzuki, Nobuo, 4,110,403, Cl. 260-603.00R.
Kurahashi, Takeo; Maeda, Shigeo; Seki, Sanai; Suzuki, Nobuo; and Sakai, Takayuki, 4,110,070, Cl. 8-2.50R.
Suzuki, Osamu: *See*—
Yoshida, Yoshiaki; Suzuki, Osamu; and Onoue, Keizi, 4,109,450, Cl. 57-34.00R.
Svanstrom, Alf Henrik; and Kangas, Karl-Erik, to Fagersta Secoroc AB. Plain and thrust bearing device. 4,109,974, Cl. 308-8.200.
Svenska Traforskningsinstitutet: *See*—
Eriksson, Leif, 4,109,520, Cl. 73-143.000.
Pettersson, Torulf; Fladda, Gerdt; and Eriksson, Lennart, 4,110,044, Cl. 356-103.000.
Swanson, Billy L., to Phillips Petroleum Company. Stabilized aqueous gels and uses thereof. 4,110,226, Cl. 252-8.50C.
Swanson, Billy L., to Phillips Petroleum Company. Stabilized aqueous gels and uses thereof. 4,110,231, Cl. 252-8.50C.
Sweeney, Richard F.: *See*—
Anello, Louis G.; and Sweeney, Richard F., 4,110,406, Cl. 260-653.400.
Anello, Louis G.; Sweeney, Richard F.; and Sukornick, Bernard, 4,110,407, Cl. 260-653.400.
Anello, Louis G.; and Sweeney, Richard F., 4,110,408, Cl. 260-653.400.
Sweet, Lawrence A., to Minnesota Mining and Manufacturing Company. Muffler. 4,109,749, Cl. 181-230.000.
Swenson, Willard E., Jr., to Chrysler Corporation. Photoelastic stamping analysis. 4,109,515, Cl. 73-88.00A.
Swiss Aluminium Ltd.: *See*—
Tschopp, Theodor, 4,110,179, Cl. 204-67.000.
Sybron Corporation: *See*—
Goethel, James Herbert; and Sohngen, Edwin Lowe, 4,109,656, Cl. 128-266.000.
Synres International B.V.: *See*—
Pons, Dick A.; and Bijker, Anno, 4,110,285, Cl. 260-29.6MP.
Syntex (U.S.A.) Inc.: *See*—
Beard, Colin C.; Wallach, Marshall B.; and Weinhardt, Klaus, 4,110,463, Cl. 424-273.00R.
Szala, Lawrence E.: *See*—
Lee, Minyoung; and Szala, Lawrence E., 4,110,084, Cl. 51-307.000.
Szarvasi, Etienne, to Lipha, Lyonnaise Industrielle Pharmaceutique. Triazolobenzodiazepines. 4,110,337, Cl. 260-308.00R.
Szemeredi, Robert S., to Price-Pfister Brass Mfg. Co. Snap-in valve cartridge. 4,109,672, Cl. 137-315.000.
Tabanou, Jacques Rene, to Schlumberger Technology Corporation. Well logging apparatus with pad-mounted array of vertical electrodes of different lengths for measuring the resistivity of the flushed zone. 4,110,682, Cl. 324-10.000.
Tabata, Yasuhiro, to Ricoh Company, Ltd. Duplex electrostatic copying machine. 4,110,025, Cl. 355-3.0SH.
Tagashira, Yoshimi: *See*—
Matsumoto, Youichi; Tagashira, Yoshimi; and Yokoyama, Seijiro, 4,110,706, Cl. 332-19.000.
Tager, Semen Alexandrovich: *See*—
Vorona, Dmitry Afanasievich; Chikul, Vitaly Ivanovich; Smirnov, Alexandr Stepanovich; Chikul, Olga Semenovna; Yagunov, Boris Ivanovich; Tager, Semen Alexandrovich; Shipkov, Nikolai Nikolaevich; Perepelkin, Arkady Vitalievich; Grigorieva, Elizaveta Alexeevna; Krasnovsky, Gennady Alexeevich, deceased; and Krasnovskaya, Tatyana Sergeevna, administratrix, 4,110,064, Cl. 431-171.000.
Tajiri, Atsufumi, to Denki Onkyo Co., Ltd. Deflection yoke. 4,110,793, Cl. 358-248.000.
Takahashi, Keikichi: *See*—
Suzuki, Keiichi; Takahashi, Keikichi; Matsuura, Eiichi; and Harada, Akinobu, 4,109,458, Cl. 58-63.000.
Takahashi, Seizi: *See*—
Uchino, Mitsuo; and Takahashi, Seizi, 4,109,627, Cl. 123-140.00R.
Takahashi, Tokuji, to Konishiroku Photo Industry Co., Ltd. Inspection apparatus for automatically detecting the unevenness or the flaws of a coating. 4,110,047, Cl. 356-200.000.
Takano, Shuntaro: *See*—
Saikawa, Isamu; Takano, Shuntaro; Yoshida, Chosaku; Takashima, Okuta; Momonoi, Kaishu; Kuroda, Seietsu; Komatsu, Miwako; Yasuda, Takashi; and Kodama, Yutaka, 4,110,327, Cl. 544-385.000.
Takashima, Okuta: *See*—
Saikawa, Isamu; Takano, Shuntaro; Yoshida, Chosaku; Takashima, Okuta; Momonoi, Kaishu; Kuroda, Seietsu; Komatsu, Miwako; Yasuda, Takashi; and Kodama, Yutaka, 4,110,327, Cl. 544-385.000.
Takasu, Shigetoshi: *See*—
Honda, Ichiro; Takasu, Shigetoshi; and Onuki, Yoshio, 4,109,709, Cl. 165-105.000.
Takatsu, Suehiro. Shock absorbing device with restoring inhibiting means. 4,109,899, Cl. 267-140.000.
Takayama, Chiyozo; Yamamoto, Shigeo; Kato, Toshiro; Hisada, Yoshio; and Fujinami, Akira, to Sumitomo Chemical Company, Limited. N'-sulfenyl-N''-dihalophenylimidazolidinediones. 4,110,462, Cl. 424-273.00R.
Takeda Chemical Industries, Ltd.: *See*—
Maeda, Kazuo; Noguchi, Katuichi; Kawabata, Masuo; Sato, Shigehiko; and Sato, Yukio, 4,109,663, Cl. 131-2.000.
Minami, Isao; Yoshioka, Yoshio; and Nomura, Hiroaki, 4,110,537, Cl. 544-313.000.
Takeda Riken Kogyo Kabushikikaisha: *See*—
Furukawa, Hikaru; Mitamura, Masakazu; and Higuchi, Kenji, 4,110,746, Cl. 340-347.0NT.
Takeshige, Kenji: *See*—
Koshiga, Fusao; Tanaka, Jinkichi; Watanabe, Itaru; Suzuki, Motoaki; Kojima, Toshifumi; Matsubara, Hiroyoshi; Osuka, Tatsumi; Takeshige, Kenji; Nagamine, Takashi; and Hirano, Osamu, 4,110,589, Cl. 219-66.000.
Takeuchi, Yukihisa; and Wakayama, Masao, to Nippon Soken, Inc. Catalyst for reforming fuel and method for producing same. 4,110,256, Cl. 252-465.000.

Takiguchi, Yoshimi: *See*—
Furuta, Isao; and Takiguchi, Yoshimi, 4,110,183, Cl. 204-157.10R.

Tall, Joel, to Joel Tall, Inc. Method of splicing multitrack sound recording tape. 4,110,142, Cl. 156-159.000.

Tamabayashi, Hanzo; Hattori, Tatsuo; Tanaka, Tetsuo; Oda, Yasuhiro; and Kihara, Keiichi, to Toyo Soda Manufacturing Co., Ltd. Process for producing alkali metal styrenesulfonate. 4,110,366, Cl. 260-505.00N.

Tamagawa, Tohoru: *See*—
Murano, Minoru; Yanabu, Satoru; Tamagawa, Tohoru; and Ikeda, Hisatoshi, 4,110,806, Cl. 361-4.000.

Tamai, Yasuo: *See*—
Ogawa, Hiroshi; Aonuma, Masashi; Nakamura, Matsuaki; and Tamai, Yasuo, 4,110,503, Cl. 428-64.000.

Tamura, Hiroshi: *See*—
Hamada, Nobuhiro; Hirasawa, Kotaro; Hatada, Minoru; and Tamura, Hiroshi, 4,109,808, Cl. 214-152.000.

Tanaka, Akira, to Yoshida Kogyo K.K. Slide fastener. 4,109,349, Cl. 24-205.11R.

Tanaka, Hiroshi: *See*—
Katada, Michihisa; Hayashi, Katsutake; Katsura, Hakuji; Tomita, Kenichi; Morohoshi, Hideo; Uehara, Keiichi; and Tanaka, Hiroshi, 4,110,626, Cl. 252-522.000.

Tanaka, Jinkichi: *See*—
Koshiga, Fusao; Tanaka, Jinkichi; Watanabe, Itaru; Suzuki, Motoaki; Kojima, Toshifumi; Matsubara, Hiroyoshi; Osuka, Tatsumi; Takeshige, Kenji; Nagamine, Takashi; and Hirano, Osamu, 4,110,589, Cl. 219-66.000.

Tanaka, Kunihiko: *See*—
Kamiya, Takashi; Tanaka, Kunihiko; and Shiokawa, Youichi, 4,110,338, Cl. 260-308.00D.

Tanaka, Tetsuo: *See*—
Tamabayashi, Hanzo; Hattori, Tatsuo; Tanaka, Tetsuo; Oda, Yasuhiro; and Kihara, Keiichi, 4,110,366, Cl. 260-505.00N.

Tann, Lewis H.; Mueller, William L.; and Vis, Arthur D., to Candid Logic, Inc. Optical position transducer. 4,110,611, Cl. 250-237.00R.

Tarbell, Harlan E.; and Raabe, Paul J., to Grefco, Inc. Splicing strip. 4,110,501, Cl. 428-40.000.

Tasaka, Eiji: *See*—
Uchida, Tsutomu; Ono, Zenichi; Nagashima, Makoto; Tasaka, Eiji; Mitsui, Shigeo; and Nomura, Keiichi, 4,109,801, Cl. 214-6.0FS.

Tasseff, John B., II: *See*—
Hubble, Fred F., III; and Tasseff, John B., II, 4,110,811, Cl. 361-225.000.

Tate & Lyle Limited: *See*—
Righelato, Renton Clive; and Jarman, Trevor Rodney, 4,110,162, Cl. 195-31.00P.

Taunus-Armaturen GmbH: *See*—
Urbaschek, Herbert, 4,109,921, Cl. 277-24.000.

Tausch, Gerald, to Miller-Holzwarth, Inc. Periscope construction. 4,110,011, Cl. 350-301.000.

Taylor, Brian W.: *See*—
Bailey, Wayne W.; and Taylor, Brian W., 4,110,233, Cl. 252-41.000.

Taylor, George Phillips: *See*—
Leininger, Joel Calvin; and Taylor, George Phillips, 4,110,832, Cl. 364-786.000.

Taylor, Glenn N., to Kendall Company, The. Liquid sampling device. 4,109,837, Cl. 222-556.000.

Taylor, Herman, Jr.: *See*—
Hildebrand, Richard Emil; Paraskos, John Angelo; and Taylor, Herman, Jr., 4,110,192, Cl. 208-8.000.

Taylor, John Edward, to BICC Limited. Methods of jointing optical fibres. 4,109,369, Cl. 29-467.000.

Taylor, Michael G. C., to GTE ATEA, S.A. Dual tone multifrequency generator. 4,110,568, Cl. 179-84.0VF.

Taylor, Michael Rivers: *See*—
Garrett, Ian; and Taylor, Michael Rivers, 4,110,133, Cl. 148-171.000.

TDK Electronics Co., Ltd.: *See*—
Osawa, Masayuki, 4,109,878, Cl. 242-68.300.

Teach, Eugene G., to Stauffer Chemical Company. Aromatic N-substituted halo-substituted-2-pyrrolidinones and their utility as herbicides. 4,110,105, Cl. 71-95.000.

Tecnologia Industrial, Proyectos Y Promociones, S.A.: *See*—
Bosch, Juan, 4,109,490, Cl. 66-120.000.

Tecumseh Products Company: *See*—
Wisner, Ronald R., 4,109,364, Cl. 29-156.50R.

Teggers, Johannes: *See*—
Hilberath, Friedrich; and Teggers, Johannes, 4,109,701, Cl. 165-1.000.

Teijin Limited: *See*—
Ichikawa, Yataro; Kobayashi, Osamu; Soma, Kazuhiko; Naruchi, Tatuyuki; Yamanaka, Yoshiyuki; and Suzuki, Nobuo, 4,110,403, Cl. 260-603.00R.

Tektronix, Inc.: *See*—
Janko, Bozidar; and Silzars, Aris, 4,110,749, Cl. 340-365.00C.
Mason, William Miller; and McTeague, Gerald Emmett, 4,110,659, Cl. 313-398.000.

Tele-Quik, Inc.: *See*—
Breitbard, Elford Barnett, 4,109,890, Cl. 248-452.000.

Telediffusion de France: *See*—
Mignot, Lucien F.; and Macheboeuf, Guy R., 4,110,786, Cl. 358-22.000.

Telford, James M.: *See*—
Freeman, Willie B.; Yeckley, Russell N.; Soles, Otto H.; and Telford, James M., 4,110,578, Cl. 200-148.00F.

Temet OY.: *See*—
Purhonen, Matti, 4,109,754, Cl. 181-252.000.

Tennant, David John; Sheridan, Geoffrey Philip; and Steel, Alistair James, to Lankro Chemicals Group Limited. Compositions and processes for the dispersing of oil spillages. 4,110,213, Cl. 210-59.000.

Tenneco, Inc.: *See*—
Grueneberg, Gary L., 4,109,755, Cl. 181-256.000.

Terada, Takami, to Aisin Seiki Kabushiki Kaisha. Vehicle seat slide adjuster including integrally formed pawl and pawl lever. 4,109,973, Cl. 308-3.00R.

Teraishi, Katsuhiro: *See*—
Yamada, Kuniharu; and Teraishi, Katsuhiro, 4,109,456, Cl. 58-23.0AC.

Teraoka, Kazuharu; Sato, Mitsuru; and Mineo, Masao, to Teraoka Seikosho Co., Ltd. Automatic unit price setting apparatus of electronic digital display scale with printing device. 4,109,857, Cl. 235-378.000.

Teraoka Seikosho Co., Ltd.: *See*—
Teraoka, Kazuharu; Sato, Mitsuru; and Mineo, Masao, 4,109,857, Cl. 235-378.000.

Teroson G.m.b.H.: *See*—
Rocholl, Martin-Gottfried, 4,110,148, Cl. 156-359.000.

Tesch, Karl: *See*—
Schutz, Karl-Heinz; and Tesch, Karl, 4,110,769, Cl. 354-195.000.

Teuchert, Eberhard: *See*—
Maly, Vladimir; and Teuchert, Eberhard, 4,110,158, Cl. 176-58.0PB.

Texaco Development Corporation: *See*—
Gipson, Robert Malone, 4,110,352, Cl. 260-348.290.
Marion, Charles P., 4,110,359, Cl. 260-449.500.
Paull, Peter L.; and Archer, Henry W., 4,110,628, Cl. 290-1.00R.
Schulze, Heinz; and Waddill, Harold G., 4,110,309, Cl. 528-119.000.
Schulze, Heinz; and Waddill, Harold G., 4,110,310, Cl. 528-119.000.
Schulze, Heinz; and Waddill, Harold G., 4,110,313, Cl. 528-90.000.
Schulze, Heinz; and Marquis, Edward T., 4,110,371, Cl. 260-531.00C.

Texaco Exploration Canada, Ltd.: *See*—
Allen, Joseph C.; and Redford, David A., 4,109,720, Cl. 166-269.000.

Texaco Inc.: *See*—
Allen, Joseph C.; and Redford, David A., 4,109,720, Cl. 166-269.000.
Allen, Joseph C., 4,110,224, Cl. 252-8.55D.
Carlin, Joseph T.; Tyler, Timothy N.; Mills, Melvin E., Jr.; and Ware, James W., 4,110,229, Cl. 252-8.55D.
Fuller, Lester R.; and Meyer, Herbert J., 4,110,728, Cl. 340-15.5DP.
Knifton, John F., 4,110,340, Cl. 260-326.5FL.
Tyler, Timothy N.; Mills, Melvin E., Jr.; Wells, John A.; and Carlin, Joseph T., 4,110,228, Cl. 252-8.55D.
Vreugde, Theodorus L. J., 4,110,729, Cl. 340-15.5MC.
Waldbillig, James O.; Cusano, Carmen M.; Reed, David D.; and Winstead, Richard L., 4,110,235, Cl. 252-51.50R.
Widmyer, Richard H.; and Park, Jack H., 4,109,722, Cl. 166-281.000.
Widmyer, Richard H., 4,109,723, Cl. 166-303.000.

Texas Alkyls, Inc.: *See*—
Watson, Spencer C.; Malpass, Dennis B.; and Yeargin, G. Scott, 4,110,357, Cl. 260-448.00A.

Texas Instruments Incorporated: *See*—
Giolma, William Henry; and Andresen, Bernhard Hans, 4,110,707, Cl. 332-19.000.
Grenier, Aime J., 4,110,717, Cl. 335-22.000.
Noe, Terry Wayne, 4,110,838, Cl. 365-2.000.
Rao, G. R. Mohan; Stanczak, John S.; Lien, Jih-Chang; and Bhatia, Shyam, 4,110,776, Cl. 357-23.000.
Redwine, Donald J., 4,110,639, Cl. 307-279.000.
Small, Richard B., 4,110,598, Cl. 219-216.000.
Wood, James Carlos; and Felcman, Francis Adolph, 4,110,050, Cl. 400-248.000.

Teyssandier, Raymond G., to Westinghouse Electric Corp. Method of determining acoustic flow meter correction factor. 4,109,523, Cl. 73-194.00A.

Theunissen, Matthias Johannes Joseph: *See*—
Esser, Leonard Jan Maria; and Theunissen, Matthias Johannes Joseph, 4,110,777, Cl. 357-24.000.

Thexton Manufacturing Company: *See*—
Clark, Robert E., 4,109,544, Cl. 74-242.700.

Theyssen, Johannes: *See*—
Berzen, Josef; and Theyssen, Johannes, 4,110,391, Cl. 264-120.000.

Thiele, Hubertus, to Robert Bosch GmbH. Noise reduction arrangement in a claw-type dynamo electric machine, particularly multiphase automotive-type a-c generator. 4,110,642, Cl. 310-51.000.

Thiessen, Fritz: *See*—
Engelbach, Heinz; Krabetz, Richard; Duembgen, Gerd; Willersinn, Carl-Heinz; Frey, Walter; Lebert, Ulrich; and Thiessen, Fritz, 4,110,370, Cl. 260-530.00N.

Thiokol Corporation: *See*—
Graham, William Hardin; and Shepard, Inella Gatlin, 4,110,135, Cl. 149-19.400.

Thir, Basil: *See*—
Newkirk, David Dudley; Login, Robert Bernard; and Thir, Basil, 4,110,227, Cl. 252-8.900.

Thomas C. Wilson, Inc.: *See*—
Schott, Donald E., 4,109,513, Cl. 73-49.100.

Thomas, David Hamilton, to Imperial Chemical Industries Limited. Rheometer and uses thereof. 4,109,514, Cl. 73-58.000.

Thomas, Norman W.; Berardinelli, Frank M.; and Edelman, Robert, to Celanese Corporation. Reinforced polycarbodiimide modified polyalkylene terephthalate. 4,110,302, Cl. 260-40.00R.
Thomerson, Clarence T.: *See—*
Files, James H.; Montague, John M.; and Thomerson, Clarence T., 4,109,474, Cl. 61-48.000.
Thompson, Don D., to Chevron Research Company. Method of borehole logging using passive Josephson current detector to directly determine the presence of hydrocarbons. 4,109,522, Cl. 73-154.000.
Thomson-CSF: *See—*
Abert-Mellah, Marie Annick; Dubois, Jean Claude; and Zann, Annie, 4,110,243, Cl. 252-299.000.
Bert, Alain; and Kantorowicz, Gerard, 4,110,839, Cl. 365-180.000.
Hartemann, Pierre, 4,110,653, Cl. 310-313.000.
Sirven, Jacques, 4,110,753, Cl. 343-8.000.
Trotel, Jacques, 4,110,622, Cl. 250-396.00R.
Thomson, Elihu Craig, to Electronics Corporation of America. Two-terminal photodetectors with inherent AC amplification properties. 4,110,608, Cl. 250-214.00A.
Three Sisters Ranch Enterprise: *See—*
Faulstich, George W., 4,109,816, Cl. 215-256.000.
Thyssen Aufzuge GmbH: *See—*
Fromme, Hans-Georg; and Dieter, Guckenhan, 4,109,768, Cl. 191-22.00R.
Tiefenthaler, Arthur: *See—*
Mettler, Karl; Marxer, Paul; and Tiefenthaler, Arthur, 4,110,051, Cl. 403-157.000.
Tigreat, Paul, to Commissariat a l'Energie Atomique; and Societe pour l'Etude et la Fabrication de Circuits Integres Speciaux. Drawing machines especially for integrated circuit masks. 4,110,762, Cl. 354-4.000.
Timmons, Eric: *See—*
Briggs, Alan H.; and Timmons, Eric, 4,109,586, Cl. 105-224.00A.
Tippin, Billy B.: *See—*
Pennings, Matheus D.; and Tippin, Billy B., 4,109,846, Cl. 228-4.500.
Tobishima Kensetsu Kabushiki Kaisha: *See—*
Hashimoto, Hiroshi, 4,109,575, Cl. 102-22.00R.
Toei Denshi Kogyo Kabushiki Kaisha: *See—*
Akutsu, Shoji; Watanabe, Yasumasa; Mashino, Yasuhiko; Chaki, Tomohiro; and Fujita, Masakazu, 4,110,048, Cl. 356-200.000.
Tokai Denka Kabushiki Kaisha: *See—*
Matsumoto, Akira; and Itani, Katsutoshi, 4,110,237, Cl. 252-79.400.
Tokuhara, Masaharu: *See—*
Hongu, Masayuki; Tokuhara, Masaharu; and Kawakami, Hiromi, 4,110,635, Cl. 307-233.00R.
Tokumaru, Yukuya; and Nakai, Masanori, to Tokyo Shibaura Electric Co., Ltd. Gate circuit. 4,110,634, Cl. 307-213.000.
Tokyo Denki Kagaku Kogyo Kabushiki Kaisha (TDK Electronics Co., Ltd.): *See—*
Yamamoto, Hirotaka; Sendai, Satoshi; and Ninomiya, Hideaki, 4,110,260, Cl. 252-519.000.
Tokyo Jiki InsatsuKabushiki Kaisha: *See—*
Hoshino, Yasushi; and Namikawa, Mamoru, 4,110,797, Cl. 360-17.000.
Tokyo Shibaura Denki Kabushiki Kaisha: *See—*
Murano, Minoru; Yanabu, Satoru; Tamagawa, Tohoru; and Ikeda, Hisatoshi, 4,110,806, Cl. 361-4.000.
Tokyo Shibaura Electric Co., Ltd.: *See—*
Hisano, Hiroshi; and Sato, Kyoichi, 4,110,821, Cl. 363-141.000.
Ishii, Kazuo, 4,110,559, Cl. 179-1.00D.
Kageyama, Satoshi; and Sekiya, Kunihiko, 4,110,558, Cl. 178-69.100.
Tokumaru, Yukuya; and Nakai, Masanori, 4,110,634, Cl. 307-213.000.
Tomita, Kenichi: *See—*
Katada, Michihisa; Hayashi, Katsutake; Katsura, Hakuji; Tomita, Kenichi; Morohoshi, Hideo; Uehara, Keiichi; and Tanaka, Hiroshi, 4,110,626, Cl. 252-522.000.
Toms River Chemical Corporation: *See—*
Fitzpatrick, Joseph W.; and Olin, Arthur D., 4,110,072, Cl. 8-25.000.
Tomy Kogyo Co., Inc.: *See—*
Matsumoto, Takao, 4,109,914, Cl. 273-101.000.
Saito, Makoto, 4,109,412, Cl. 46-216.000.
Toray Silicone Company, Ltd.: *See—*
Matsushita, Takao, 4,110,300, Cl. 260-37.0SB.
Tornborg & Lundberg AB: *See—*
Stahl, John Edvard Lennart, 4,109,681, Cl. 137-615.000.
Toshin Seiko Kabushiki Kaisha: *See—*
Uchida, Tsutomu; Ono, Zenichi; Nagashima, Makoto; Tasaka, Eiji; Mitsui, Shigeo; and Nomura, Keiichi, 4,109,801, Cl. 214-6.0FS.
Towmotor Corporation: *See—*
Evans, Dafydd W., 4,109,748, Cl. 180-141.000.
Povejsil, James H., 4,109,546, Cl. 74-474.000.
Townsend, Robert H., to Xerox Corporation. Magnetic head assembly adjustable relative to roll, pitch and azimuth. 4,110,803, Cl. 360-109.000.
Toyama Chemical Co., Ltd.: *See—*
Saikawa, Isamu; Takano, Shuntaro; Yoshida, Chosaku; Takashima, Okuta; Momonoi, Kaishu; Kuroda, Seietsu; Komatsu, Miwako; Yasuda, Takashi; and Kodama, Yutaka, 4,110,327, Cl. 544-385.000.
Toyo Boseki Kabushiki Kaisha: *See—*
Imanaka, Hiroshi; Kijima, Yoshihiko; Sugitawa, Chikara; and Sumoto, Misao, 4,110,411, Cl. 260-873.000.
Toyo Ink Manufacturing Co., Ltd.: *See—*
Mori, Masatoshi; and Fukata, Ryoji, 4,110,290, Cl. 260-29.6RW.
Toyo Soda Manufacturing Co., Ltd.: *See—*
Tamabayashi, Hanzo; Hattori, Tatsuo; Tanaka, Tetsuo; Oda, Yasuhiro; and Kihara, Keiichi, 4,110,366, Cl. 260-505.00N.
Toyoda-Koki Kabushiki Kaisha: *See—*
Enomoto, Minoru, 4,110,674, Cl. 318-571.000.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Kohama, Tokio; Obayashi, Hideki; Ozaki, Tadashi; and Nohira, Hidetaka, 4,109,462, Cl. 60-278.000.
Konishi, Masami; Nakamura, Norihiko; Itou, Takaaki; and Kikuchi, Kazuo, 4,110,417, Cl. 261-39.00A.
Trak Sportartikel GmbH: *See—*
Woitschatzke, Hans; and Geyer, Hennoch, 4,109,931, Cl. 280-605.000.
Trame, Charles Edward, to Everbrite Electric Signs, Inc. Method of making simulated three-dimensional stained glass objects. 4,110,393, Cl. 264-132.000.
Trans World Technology Laboratories, Inc. (TWT Labs Inc.): *See—*
Gager, Morgan E., 4,109,937, Cl. 282-27.500.
Traynor, James Rodney: *See—*
Dart, Edward Charles; Cantwell, John Burnett; Traynor, James Rodney; Jaworzyn, Joseph Franciszek; and Nemcek, Jozef, 4,110,184, Cl. 204-159.230.
Tregoning, Geoffrey Robinson: *See—*
Newson, John Chase; Tregoning, Geoffrey Robinson; and Digby, James Baden, 4,109,416, Cl. 49-316.000.
Tremblay, Dennis D.: *See—*
Heyning, Bjorn; and Tremblay, Dennis D., 4,110,750, Cl. 340-384.00E.
Tresper, Erhard: *See—*
Freitag, Dieter; Tresper, Erhard; Kuchenmeister, Rolf; and Beer, Wolfgang, 4,110,540, Cl. 568-718.000.
Treuner, Uwe: *See—*
Breuer, Hermann; and Treuner, Uwe, 4,110,535, Cl. 544-21.000.
Tribken, Everett R.; Miller, Ronald J.; and Griffith, Carl D., to Sperry Rand Corporation. Semi-automatic flight control system utilizing limited authority stabilization system. 4,109,886, Cl. 244-178.000.
Trinchera, Luigi, to California Cedar Products Company. Apparatus and method for brazing tips on circular saw teeth. 4,110,591, Cl. 219-85.0CA.
Trosper, Milton French, Jr.: *See—*
Heitmann, Glenn Alvin; and Trosper, Milton French, Jr., 4,110,513, Cl. 428-528.000.
Trotel, Jacques, to Thomson-CSF. Device which makes it possible to effect the programmed tracing of figures which have different shapes. 4,110,622, Cl. 250-396.00R.
Troup, George: *See—*
Hansen, Arne; and Troup, George, 4,109,726, Cl. 169-11.000.
TRW Inc.: *See—*
Moed, Johannes A. R., 4,110,562, Cl. 179-15.0BY.
Quigley, James R., 4,109,370, Cl. 29-566.300.
Trzeciak, Thomas A.: *See—*
LaCamera, Alfred F.; Trzeciak, Thomas A.; and Kinosz, Donald L., 4,110,178, Cl. 204-54.00R.
Tschopp, Theodor, to Swiss Aluminium Ltd. Process and device for the production of aluminium by the electrolysis of a molten charge. 4,110,179, Cl. 204-67.000.
Tsuboi, Shinichi: *See—*
Saito, Junichi; Kudamatsu, Akio; Kume, Toyohiko; Shiokawa, Kozo; and Tsuboi, Shinichi, 4,110,440, Cl. 424-207.000.
Tuba, Zoltan; and Marsai, Maria, to Richter Gedeon Vegyeszeti Gyar Rt. Acylated diepoxy-androstane and a process for the preparation thereof. 4,110,326, Cl. 260-239.55R.
Tucel Industries, Inc.: *See—*
Lewis, John C., Jr., 4,109,965, Cl. 300-7.000.
Tucker, Robert R. Coffee percolator. 4,109,565, Cl. 99-283.000.
Tuckmantel, Hans-Joachim, to Kempchen & Co. GmbH. Pipe joint. 4,109,923, Cl. 277-101.000.
TUP! (Panama) S.A.: *See—*
Tupper, Earl Silas, 4,109,329, Cl. 5-61.000.
Tupper, Earl Silas, to TUP! (Panama) S.A. Invalid bed. 4,109,329, Cl. 5-61.000.
Turner, James E., to Cry Baby, Inc. Method for extruding porous irrigation pipe. 4,110,420, Cl. 264-41.000.
Turner, William D.: *See—*
Cronshaw, David; Shemer, Jack E.; Turner, William D.; Hartke, David; Keddy, James R.; DuVall, Wilbur E.; and Sterling, Warren M., 4,110,823, Cl. 364-200.000.
Tuttle, Paul D.: *See—*
Hawkins, Ronald G.; Tuttle, Paul D.; and Baker, Mark A., 4,110,553, Cl. 174-42.000.
Tygart, Robert Carl, to Eastman Kodak Company. Method for forming contoured tubing. 4,109,365, Cl. 29-421.00R.
Tyler, Timothy N.; Mills, Melvin E., Jr.; Wells, John A.; and Carlin, Joseph T., to Texaco Inc. Salinity tolerant surfactant oil recovery process. 4,110,228, Cl. 252-8.55D.
Tyler, Timothy N.: *See—*
Carlin, Joseph T.; Tyler, Timothy N.; Mills, Melvin E., Jr.; and Ware, James W., 4,110,229, Cl. 252-8.55D.
Ube Industries, Ltd.: *See—*
Umemura, Sumio; Ohdan, Kyoji; Sakai, Fumihiko; Bando, Yasuo; and Ikezawa, Harumi, 4,110,350, Cl. 260-346.750.
Uchida, Tsutomu; Ono, Zenichi; Nagashima, Makoto; Tasaka, Eiji; Mitsui, Shigeo; and Nomura, Keiichi, to Toshin Seiko Kabushiki Kaisha. Steel shape stacking apparatus. 4,109,801, Cl. 214-6.0FS.

Uchino, Mitsuo; and Takahashi, Seizi, to Diesel Kiki Co., Ltd. Two-speed fuel injection pump governor. 4,109,627, Cl. 123-140.00R.

Udert, Karl Ernst: *See—*
Vollmer, Helmut; Udert, Karl Ernst; and Oechsle, Hans, 4,109,556, Cl. 85-84.000.

UDP Inc.: *See—*
Flagg, John F.; and Antos, George J., 4,110,199, Cl. 208-139.000.

Uehara, Keiichi: *See—*
Katada, Michihisa; Hayashi, Katsutake; Katsura, Hakuji; Tomita, Kenichi; Morohoshi, Hideo; Uehara, Keiichi; and Tanaka, Hiroshi, 4,110,626, Cl. 252-522.000.

Uematsu, Tamon: *See—*
Inoue, Satoru; Uematsu, Tamon; and Yamashita, Norihisa, 4,110,466, Cl. 424-274.000.

Uesugi, Kyozo; Metabi, Tsuneyo; and Hachiken, Ryuzo, to Minolta Camera Kabushiki Kaisha. Cushioned objective lens. 4,110,008, Cl. 350-255.000.

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Visser, Kommer, 4,110,190, Cl. 204-224.00M.

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Goshima, Yoshitomo; Hattori, Hiroyuki; Komaba, Shiro; and Umezawa, Kazumi, 4,110,029, Cl. 355-10.000.

Unangst, Paul C.: *See—*
Brown, Richard E.; and Unangst, Paul C., 4,110,464, Cl. 424-274.000.

Union Carbide Corporation: *See—*
Boros, Eugene Joseph; and Papa, Anthony Joseph, 4,110,415, Cl. 260-953.000.
Higgins, Thomas Engel, 4,110,479, Cl. 426-277.000.
Kanner, Bernard; and Prokai, Bela, 4,110,271, Cl. 521-111.000.
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Uniroyal, Inc.: *See—*
Loveless, Frederick C.; and Nudenberg, Walter, 4,110,234, Cl. 252-47.500.

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Morris, Ronald George, 4,110,712, Cl. 333-33.000.

United States of America
Air Force: *See—*
Eden, Richard C.; and Nakano, Kenichi, 4,110,778, Cl. 357-30.000.
Martin, Gayle Patrick, 4,110,713, Cl. 333-70.00R.
Williams, Mark R.; and Martin, Gayle Patrick, 4,110,833, Cl. 364-819.000.
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Arutunian, Gregory; and Monte, Anthony J., 4,110,812, Cl. 361-248.000.
Berg, Norman J.; Smith, Bob Lorin, deceased; and Adams, Allen B., legal representative, 4,110,016, Cl. 350-358.000.
Bishov, Solomon J., 4,110,483, Cl. 426-542.000.
Devine, Patrick J., 4,109,580, Cl. 102-52.000.
Eneman, Melvin, 4,109,583, Cl. 102-244.000.
Hershkowitz, Joseph; and Akst, Irving B., 4,110,136, Cl. 149-47.000.
Korr, Abraham L.; and Rosenblatt, David B., 4,109,883, Cl. 244-3.100.
Reggia, Frank; and Jones, Howard S., Jr., 4,110,751, Cl. 343-700.0MS.
Varecka, Charles P.; and Merhar, Donald M., 4,110,730, Cl. 340-16.00R.
Zacharin, Alexey T., 4,109,455, Cl. 58-1.00R.
Energy: *See—*
Arntzen, John D., 4,110,517, Cl. 429-133.000.
Brambilla, Marco; and Lallia, Pascal, 4,110,595, Cl. 219-121.00P.
Leskovar, Branko; Buscher, Harold T.; and Kolbe, William F., 4,110,686, Cl. 324-58.50C.
Mayer, Anton, 4,109,612, Cl. 118-417.000.
O'Hare, Stephen A., 4,110,257, Cl. 252-466.00J.
Olson, Kenneth W.; Haas, William J., Jr.; and Fassel, Velmer A., 4,109,863, Cl. 239-102.000.
Stevens, Charles G., 4,110,182, Cl. 204-157.10R.
Stillwagon, Roy E., 4,110,648, Cl. 310-178.000.
Younskevicius, Robert E., 4,110,049, Cl. 356-222.000.
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Becker, Bernard; Stamper, Robert L.; Asseff, Carl F.; and Podos, Steven M., 4,110,461, Cl. 424-273.00R.
Stern, Michael D.; and Lappe, Donald L., 4,109,647, Cl. 128-2.05F.
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Paulson, Danton L.; and Hunter, Willard L., 4,110,107, Cl. 75-24.000.
Stalling, David L.; Huckins, James N.; and Smith, William Allen, 4,110,344, Cl. 260-340.300.
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Jalufka, Nelson W.; Hohl, Frank; DeYoung, Russell J.; and Williams, Michael D. Volumetric direct nuclear pumped laser. 4,110,703, Cl. 331-94.50P.
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Cason, Robert L.; and McStay, John J., 4,110,683, Cl. 324-52.000.
Kojima, Gilbert K., 4,109,644, Cl. 128-2.00V.
Navy: *See—*
Bocker, Richard P., 4,110,004, Cl. 350-162.0SF.
Cross, Leslie E.; and Newnham, Robert E., 4,109,359, Cl. 29-25.350.
Cusick, Richard T.; and Fleagle, Wilbur J., 4,110,576, Cl. 200-82.00E.
Ebeling, Charles E., Jr., 4,109,867, Cl. 239-265.150.
Iverson, Myren L., 4,109,997, Cl. 350-23.000.
Iverson, Myren L., 4,109,998, Cl. 350-23.000.
Reindel, John, 4,110,715, Cl. 333-73.00S.
Rosendahl, Gottfried R., 4,110,791, Cl. 358-233.000.
Wang, Frederick E., 4,110,111, Cl. 75-134.00A.
Wilcox, Dwight R., 4,110,697, Cl. 328-154.000.

U.S. Philips Corporation: *See—*
Bergmans, Hendrik Jan; and Drabek, Rudolf, 4,110,799, Cl. 360-70.000.
Dijkmans, Eise Carel, 4,110,636, Cl. 307-237.000.
Esser, Leonard Jan Maria; and Theunissen, Matthias Johannes Joseph, 4,110,777, Cl. 357-24.000.
van Nes, Johannes Cornelis Adrianus, 4,110,760, Cl. 354-1.000.
Wellinga, Kobus; and Mulder, Rudolf, 4,110,469, Cl. 424-304.000.

United Technologies Corporation: *See—*
Eitel, Fredrick G., 4,110,013, Cl. 350-310.000.
Prewo, Karl M., 4,110,505, Cl. 428-114.000.

University of California, The Regents of the: *See—*
Rapoport, Henry; and Barber, Randy B., 4,110,329, Cl. 260-270.00A.

UOP Inc.: *See—*
Antos, George J., 4,110,200, Cl. 208-139.000.
Antos, George J., 4,110,201, Cl. 208-139.000.
Carson, Don B., 4,109,469, Cl. 60-676.000.
Carson, Don B., 4,110,174, Cl. 203-11.000.
Grendahl, Bernard E., 4,109,891, Cl. 248-503.100.
Hayes, John C.; and Pollitzer, Ernest L., 4,110,198, Cl. 208-111.000.
Herning, Joel G.; and Shelton, James B., 4,110,197, Cl. 208-64.000.
Hilfman, Lee, 4,110,203, Cl. 208-216.000.
Hilfman, Lee, 4,110,205, Cl. 208-255.000.
Millar, Robert F.; Persico, Paul J.; and Jensen, Robert H., 4,110,081, Cl. 23-288.00G.
Nolley, John P., Jr., 4,110,087, Cl. 55-73.000.
Ryu, Ji-Yong, 4,110,410, Cl. 260-683.15B.
Selvidge, Charles W.; Morgan, Kenneth A.; and Frame, Robert R., 4,110,398, Cl. 423-62.000.
Spears, John F., Jr., 4,110,172, Cl. 202-234.000.
Winter, George R., III, 4,110,202, Cl. 208-144.000.

Upjohn Company, The: *See—*
Johnson, Roy A.; and Sih, John C., 4,110,532, Cl. 542-426.000.
Nelson, Norman A., 4,110,381, Cl. 260-590.00C.
Nelson, Norman A., 4,110,382, Cl. 260-590.00C.
Nelson, Norman A., 4,110,383, Cl. 260-590.00C.
Nelson, Norman A., 4,110,384, Cl. 260-590.00C.
Sekhar, Neel C., 4,110,161, Cl. 195-1.800.

Urano, Fumio: *See—*
Miyata, Katsuhiko; Urano, Fumio; and Arai, Akihiro, 4,110,765, Cl. 354-59.000.

Urbaschek, Herbert, to Taunus-Armaturen GmbH. Seal for pistons and piston rods of cylinder-type actuators. 4,109,921, Cl. 277-24.000.

Usui, Kiyofumi; Hirabayashi, Shigeyoshi; and Hosogaya, Hiroshi, to Shinshu Seiki Kabushiki Kaisha. Web feeding mechanism for compact printer. 4,109,843, Cl. 226-109.000.

Vacuumatic Limited: *See—*
Halsey, Arthur Ernest, 4,109,780, Cl. 198-466.000.

Valantin, Alfred A., to Charbonnages de France. Roof supports. 4,109,473, Cl. 61-45.00D.

Valbusa, Luigi: *See—*
Beretta, Paolo; and Valbusa, Luigi, 4,110,116, Cl. 96-101.000.

Valchev, Alexander Yordanov: *See—*
Peev, Vassil Georgiev; Valchev, Alexander Yordanov; and Bakalov, Nikolay Georgiev, 4,110,547, Cl. 13-11.000.

Valentino, Carl R.: *See—*
Hofer, Donald C.; Kahwaty, Vincent N.; and Valentino, Carl R., 4,110,681, Cl. 324-0.50A.

Valyi, Emery I. Composite plastic container. 4,109,813, Cl. 215-1.00C.

Van der Meulen: *See—*
Weis, Siegfried K.; and Van der Meulen, 4,109,343, Cl. 16-98.000.

Van Kooten B.V.: *See—*
Schnell, Hans Gunther, 4,109,475, Cl. 61-53.500.

Van Auken, John A. Gaming surface contact detecting systems. 4,109,911, Cl. 273-31.000.

van Beveren, Marius; and Nuhoff, Peerke Jan, to De Staat der Nederlanden, te Dezen Vertegenwoordigd Door de Directeur-Generaal der Posterijen, Telegrafie en Telefonie. Method for transmitting binary signals. 4,109,856, Cl. 235-308.000.

Vandecoevering, Kenneth E. Chainsaw vise. 4,109,900, Cl. 269-102.000.

Vandegaer, Jan E.; and Calentine, John W., to Alcolac Inc. Stable polyurethane latices, emulsifiable prepolymers therefor and methods of making the same. 4,110,286, Cl. 260-29.2TN.

Vandenberk, Jan; Kennis, Ludo E. J.; Van der Aa, Marcel J. M. C.; and Van Heertum, Albert H. M. Th., to Janssen Pharmaceutica N.V. 1,3-Dihydro-1-[3-(1-piperidinyl)propyl]-2H-benzimidazol-2-ones and related compounds. 4,110,333, Cl. 260-293.570.

Van der Aa, Marcel J. M. C.: *See—*
Vandenberk, Jan; Kennis, Ludo E. J.; Van der Aa, Marcel J. M. C.; and Van Heertum, Albert H. M. Th., 4,110,333, Cl. 260-293.570.

van der Lely, Cornelis. Soil tilling machines. 4,109,730, Cl. 172-54.000.

van der Lely, Cornelis. Soil cultivating implements. 4,109,731, Cl. 172-59.000.

van der Velden, Guido J. M.: *See—*
Wittenberg, Albert Jan; and van der Velden, Guido J. M., 4,110,040, Cl. 355-70.000.
Van Heertum, Albert H. M. Th.: *See—*
Vandenberk, Jan; Kennis, Ludo E. J.; Van der Aa, Marcel J. M. C.; and Van Heertum, Albert H. M. Th., 4,110,333, Cl. 260-293.570.
van Nes, Johannes Cornelis Adrianus, to U.S. Philips Corporation. Method of manufacturing a cathode ray tube for displaying colored pictures. 4,110,760, Cl. 354-1.000.
Vapor Corporation: *See—*
Schleicher, George W., 4,109,563, Cl. 98-40.00C.
Varecka, Charles P.; and Merhar, Donald M., to United States of America, Army. Rate sensitive system for a seismic sensing range containment apparatus. 4,110,730, Cl. 340-16.00R.
Vaughan, Lawrence G., to Du Pont de Nemours, E. I., and Company. Process for the production of tetrahydroanthraquinones. 4,110,353, Cl. 260-369.000.
Veasy, Lloyd George: *See—*
Clark, Justin S.; and Veasy, Lloyd George, 4,109,505, Cl. 73-1.00R.
Veb Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen: *See—*
Forster, Karl-Heinz; Lein, Werner; and Heiber, Hartmut, 4,109,574, Cl. 101-216.000.
Velarde, Clyde R., to Rheem Manufacturing Company. Single piston operated clip device. 4,109,363, Cl. 29-243.560.
Velsicol Chemical Corporation: *See—*
Stach, Leonard J.; Hotz, Roger D.; and Richter, Sidney B., 4,110,101, Cl. 71-88.000.
Verdicchio, Robert J.: *See—*
Lindemann, Martin K. O.; Kennedy, Robert R.; and Verdicchio, Robert J., 4,110,263, Cl. 252-545.000.
Verdol S.A.: *See—*
Perles, Rene, 4,109,770, Cl. 192-12.0BA.
Vereinigte Osterreichische Eisen-und Stahlwerke - Alpine Montan Aktiengesellschaft: *See—*
Scheurecker, Werner, 4,109,700, Cl. 164-426.000.
Vermillion, Don W., to Singer Company, The. Vacuum cleaner with bare floor cleaning brush. 4,109,342, Cl. 15-373.000.
Vettiger, Peter: *See—*
Schindler, Hans Rudolf; and Vettiger, Peter, 4,110,569, Cl. 179-84.00A.
Vibrac Corporation: *See—*
Hendershot, James R., Jr., 4,110,645, Cl. 310-154.000.
Victor Company of Japan, Ltd.: *See—*
Honjo, Yoshihiko; and Kuroda, Junji, 4,110,607, Cl. 250-201.000.
Viessmann, Hans. Boiler for the combustion of liquid or gaseous fuels. 4,109,614, Cl. 122-149.000.
Vigerstrom, Knut Birger, to Electro-Food AB. Food container having electrode pockets. 4,109,566, Cl. 99-358.000.
Vincent, David N.; and Chang, Cheng Hsiung, to Champion International Corporation. Bisfluoran chromogenic compounds, preparation thereof, and pressure-sensitive copy systems employing same. 4,110,343, Cl. 260-335.000.
Vincent, Raymond A. Dynamic balancer for rotating bodies and method of manufacturing same. 4,109,549, Cl. 74-573.00F.
Vinnemann, Antonius: *See—*
Schmid, Manfred; Sommer, Werner; and Vinnemann, Antonius, 4,109,491, Cl. 66-125.00R.
Violland, Robert; and Neel, Jean, to Rhone-Progil. Polyurethane latexes from sulfonate prepolymer, aqueous chain extension process, and coated support. 4,110,284, Cl. 260-29.2TN.
Vis, Arthur D.: *See—*
Tann, Lewis H.; Mueller, William L.; and Vis, Arthur D., 4,110,611, Cl. 250-237.00R.
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Stoev, Stoycho Mitrev; Sapunarov, Ivan Mitrev; and Manov, Emil Nikolov, 4,109,874, Cl. 241-69.000.
Visser, Kommer, to Ultra Centrifuge Nederland N.V. Apparatus for machining electrically conducting substances by electrochemical attack. 4,110,190, Cl. 204-224.00M.
Vivarelli, Gianantonio: *See—*
Ratti, Franco; Vivarelli, Gianantonio; Maganza, Dario; and D'Amore, Emanuele, 4,109,379, Cl. 29-747.000.
Vladuchick, Susan Anne, to Du Pont de Nemours, E. I., and Company. Process for preparing disalts of 3,4-dimercaptoisothiazole-5-carbonitrile [and related products therefrom]. 4,110,335, Cl. 260-302.00S.
Vofsi, David: *See—*
Aelony, David; and Vofsi, David, 4,110,379, Cl. 260-584.00R.
Vogel, Rudolf, to Salzgitter Maschinen AG. Offshore driller rig. 4,109,477, Cl. 61-87.000.
Vogel, Walter, to Cherdron, Egon; Helmboldt, Otto; and Vogel, Walter. Method for treating a medium containing water with coagulants. 4,110,209, Cl. 210-44.000.
Vogt, B. Richard: *See—*
Rovnyak, George C.; and Vogt, B. Richard, 4,110,452, Cl. 424-251.000.
Wade, Peter C.; and Vogt, B. Richard, 4,110,449, Cl. 424-250.000.
Vogt, Robert K., to E. W. Buschman Company, The. Fluid control circuit and method for an accumulator conveyor. 4,109,783, Cl. 198-781.000.
Volk, Heinrich: *See—*
Papenfuhs, Theodor; and Volk, Heinrich, 4,110,375, Cl. 260-559.00R.
Vollmer, Helmut; Udert, Karl Ernst; and Oechsle, Hans, to Hilti Aktiengesellschaft. Expansion dowel. 4,109,556, Cl. 85-84.000.
von Bebenburg, Walter; Schulmeyer, Norbert; and Jakovlev, Vladimir, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. 6-Aryl-s-triazolo-(4,3-a)-pyrido-(2,3-f)-1,4-diazepines. 4,110,455, Cl. 424-256.000.
von der Haar, Friedrich, to Max-Planck-Gesellschaft zur Forderung der Wissenschaften E.V. Method of fractionating and separating proteins. 4,110,320, Cl. 260-112.00R.
Vorona, Dmitry Afanasievich; Chikul, Vitaly Ivanovich; Smirnov, Alexandr Stepanovich; Chikul, Olga Semenovna; Yagunov, Boris Ivanovich; Tager, Semen Alexandrovich; Shipkov, Nikolai Nikolaevich; Perepelkin, Arkady Vitalievich; Grigorieva, Elizaveta Alexeevna; Krasnovsky, Gennady Alexeevich, deceased; and Krasnovskaya, Tatyana Sergeevna, administratrix. Air-jet furnace. 4,110,064, Cl. 431-171.000.
Voss, Peter, to Patent-Treuhand-Gesellschaft fur Elektrische Gluhlampen m.b.H. Configuration for reducing the turn-off time of a thyristor. 4,110,638, Cl. 307-252.00C.
Voss, Siegfried, to Aktien-Gesellschaft "Weser". Hawser hook. 4,109,602, Cl. 114-218.000.
Voxon S.p.A.: *See—*
Sattin, Leone Glicerio, 4,110,738, Cl. 340-539.000.
Vreugde, Theodorus L. J., to Texaco Inc. Reflection seismic exploration: determining interval velocity in a subsurface layer. 4,110,729, Cl. 340-15.5MC.
Vyzkumny ustav hutnictvi zeleza: *See—*
Fuxa, Jan, 4,109,516, Cl. 73-93.000.
W & F Mfg. Co., Inc.: *See—*
Newland, John W., 4,110,261, Cl. 252-522.000.
W. L. Gore & Associates, Inc.: *See—*
Yamazaki, Etsuo, 4,110,392, Cl. 264-127.000.
W. R. Grace & Co.: *See—*
Cogliano, Joseph A.; and Marans, Nelson S., 4,110,143, Cl. 156-167.000.
Hill, Richard Newton, 4,110,422, Cl. 423-317.000.
Isgur, Irving E.; Holmstrem, Andrew B.; and Hayes, Norman J., 4,110,508, Cl. 428-240.000.
Olcott, Tyler Keith; and Miller, Robert M., 4,110,390, Cl. 264-90.000.
Rosenberg, Arnold Morry; and Gaidis, James Michael, 4,110,120, Cl. 106-99.000.
W. Vinten Limited: *See—*
Harrison, Peter Arthur; Parks, Anthony John; Southgate, Malcolm Dennis; Sleath, William Derek; and Hills, Richard Keith, 4,110,037, Cl. 355-48.000.
WABCO Westinghouse GmbH: *See—*
Reinecke, Erich, 4,109,969, Cl. 303-22.00R.
Wacker-Chemitronic Gesellschaft fur Elektronik-Grundstoffe mbH: *See—*
Kohl, Franz; and Hoch, Walter, 4,110,586, Cl. 219-10.430.
Waddill, Harold G.: *See—*
Schulze, Heinz; and Waddill, Harold G., 4,110,309, Cl. 528-119.000.
Schulze, Heinz; and Waddill, Harold G., 4,110,310, Cl. 528-119.000.
Schulze, Heinz; and Waddill, Harold G., 4,110,313, Cl. 528-90.000.
Wade, Charles G., to Atlas Powder Company. Water-in-oil emulsion explosive composition. 4,110,134, Cl. 149-2.000.
Wade, Peter C.; and Vogt, B. Richard, to E. R. Squibb & Sons, Inc. 2-Substituted benzisothiazol-3-ones. 4,110,449, Cl. 424-250.000.
Wagner, Hans, to Hans Fehr GmbH. Device for inserting and/or withdrawing particularly long and/or heavy material in a storage container. 4,109,805, Cl. 214-16.40A.
Wagnon, Albert Lloyd; and Janoulis, Alexandros James. Apparatus for collecting debris floating in a stream. 4,110,216, Cl. 210-156.000.
Wahl, Harry A.: *See—*
Martin, William L.; Wahl, Harry A.; and Young, Gary C., 4,109,719, Cl. 166-259.000.
Waitz, Jay Allan: *See—*
Cooper, David J.; Waitz, Jay Allan; Counelis, Mae; and Weinstein, Jay, 4,110,439, Cl. 424-181.000.
Wakayama, Masao: *See—*
Takeuchi, Yukihisa; and Wakayama, Masao, 4,110,256, Cl. 252-465.000.
Wakeland, William E., Jr. Waterbed retainer cap. 4,109,887, Cl. 248-345.100.
Waldbillig, James O.; Cusano, Carmen M.; Reed, David D.; and Winstead, Richard L., to Texaco Inc. Ethylene-hydrocarbon copolymeric viscosity improvers containing color and stability improvers. 4,110,235, Cl. 252-51.50R.
Waldorf, Lindsey E.: *See—*
Souder, James J., Jr.; and Waldorf, Lindsey E., 4,110,587, Cl. 219-10.49R.
Waldron, Clifford Robert; and Knapp, Carl Lee, to Bendix Corporation, The. Electrical connector assembly having anti-decoupling mechanism. 4,109,990, Cl. 339-89.00M.
Wall, Richard E. Expandable camper apparatus. 4,109,954, Cl. 296-23.00A.
Wallace Business Forms, Inc.: *See—*
Steidinger, Donald J., 4,109,936, Cl. 282-11.50A.
Wallach, Marshall B.: *See—*
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Walsh, Michael Andrew: *See—*
Benjamin, Lawrence; and Walsh, Michael Andrew, 4,110,498, Cl. 428-35.000.
Walter, James Morgan: *See—*
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Walton, Charles Eugene, II: *See*—
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Wang, Frederick E., to United States of America, Navy. Metal alloy and method of preparation thereof. 4,110,111, Cl. 75-134.00A.
Wang, Jin Liang, to Goodyear Tire & Rubber Company, The. Fire retardant acrylic terpolymer composition and films thereof. 4,110,296, Cl. 260-30.60R.
Wang, Samuel Shan Ning; and Smith, Eugene Leroy, Jr., to American Cyanamid Company. Process for flotation of non-sulfide ores. 4,110,207, Cl. 209-166.000.
Ware, James W.: *See*—
Carlin, Joseph T.; Tyler, Timothy N.; Mills, Melvin E., Jr.; and Ware, James W., 4,110,229, Cl. 252-8.55D.
Warner Bros. Inc.: *See*—
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Warner-Lambert Company: *See*—
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Stoss, Peter; Satzinger, Gerhard; and Herrmann, Manfred, 4,110,448, Cl. 424-247.000.
Washio, Masayuki; and Harada, Tetsuya, to Nissan Motor Company, Limited; and Atsugi Motor Parts Company, Limited. Vacuum regulation valve in an exhaust gas recirculation system. 4,109,624, Cl. 123-119.00A.
Watanabe, Itaru: *See*—
Koshiga, Fusao; Tanaka, Jinkichi; Watanabe, Itaru; Suzuki, Motoaki; Kojima, Toshifumi; Matsubara, Hiroyoshi; Osuka, Tatsumi; Takeshige, Kenji; Nagamine, Takashi; and Hirano, Osamu, 4,110,589, Cl. 219-66.000.
Watanabe, Masanori: *See*—
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Watanabe, Masao: *See*—
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Watanabe, Yasumasa: *See*—
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Watatani, Yoshizumi, to Hitachi, Ltd. Color signal processing apparatus for video signal recording and reproducing system. 4,110,761, Cl. 358-4.000.
Watkins, James F., to Clyde Machines, Inc. Sectional grain drill hitch. 4,109,928, Cl. 280-411.00R.
Watson, Barry Kenneth, to Marconi Company Limited, The. Microwave bank branching arrangements. 4,110,710, Cl. 333-10.000.
Watson, James Henry Peter, to English Clays Lovering Pochin & Company Limited. Apparatus for separating magnetizable particles from a fluid. 4,110,222, Cl. 210-222.000.
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Bauman, William C.; Lee, John M.; and Watson, John D., 4,110,402, Cl. 423-166.000.
Watson, Spencer C.; Malpass, Dennis B.; and Yeargin, G. Scott, to Texas Alkyls, Inc. Intermediates for preparation of unsaturated alcohols. 4,110,357, Cl. 260-448.00A.
Watts, Eric Alfred, to Beecham Group Limited. Chroman derivatives. 4,110,347, Cl. 260-345.200.
Watts, William A.: *See*—
Evans, Theodore A.; and Watts, William A., 4,110,500, Cl. 428-35.000.
Webb, Derrel D.; and Anderson, Edwin A. Double acting jar. 4,109,736, Cl. 175-297.000.
Webb, George M. Carburetion modifying device. 4,109,620, Cl. 123-52.00M.
Weber, Helmut: *See*—
Bauer, Karl A.; Baur, Peter F.; Biedermann, Horst H.; Madel, Andreas; Nitsch, Friedrich; Pechinger, Ernst; Koenig, Walter; Ipfelkofer, Armin; Rindsfuesser, Johann J.; and Weber, Helmut, 4,109,779, Cl. 400-584.000.
Wedge, Donald G.; and Zirkelbach, Albert W. Snap dies. 4,109,845, Cl. 227-144.000.
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Weinstein, Jay: *See*—
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Weir, Niall Galbraith: *See*—
Clark, John Colin; Kennedy, James; Long, Alan Gibson; and Weir, Niall Galbraith, 4,110,534, Cl. 544-16.000.
Weis, Siegfried K.; and Van der Meulen, to C. L. Frost & Son, Inc. Trolley wheel assembly. 4,109,343, Cl. 16-98.000.
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Keller, Robert B., 4,109,646, Cl. 128-2.05C.
Weiss, Martin Joseph: *See*—
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Weisshaar, Erich: *See*—
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Weitzman, Barry Sheldon. Rotatable compartmentalized vending apparatus. 4,109,825, Cl. 221-14.000.
Welding Engineers, Inc.: *See*—
Skidmore, Richard H., 4,110,843, Cl. 366-83.000.
Weller, Peter A., to McCord Corporation. Lightweight bumper guards. 4,109,951, Cl. 293-65.000.
Wellinga, Kobus; and Mulder, Rudolf, to U.S. Philips Corporation. Insecticidal N-(2,6-dichlorobenzoyl)-N'-(4-cyanophenyl) urea. 4,110,469, Cl. 424-304.000.
Wells, John A.: *See*—
Tyler, Timothy N.; Mills, Melvin E., Jr.; Wells, John A.; and Carlin, Joseph T., 4,110,228, Cl. 252-8.55D.
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Johnson, Delmar R.; Flint, John R.; Wells, Thomas R.; Erikson, Rolf B.; and Rady, Bruce A., 4,110,020, Cl. 353-26.00A.
Wells, William J., III; and Stautzenberger, Adin Lee, to Celanese Corporation. Trioxane production. 4,110,298, Cl. 260-340.000.
Weman, Per Olof, to Sigmatex, A.G. Flap buckle. 4,109,935, Cl. 280-747.000.
Wentz, Klaus: *See*—
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Wenz, Herbert: *See*—
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Bryant, Clifford Aldene, 4,109,592, Cl. 112-79.00A.
West, Vallie D.; and Kennedy, Jesse. Machine for installing giant tires on one-piece rims. 4,109,698, Cl. 157-1.200.
Westberg, Erik, to Aktiebolaget Tudor. Methods for applying material to the end of elongate objects. 4,110,490, Cl. 427-180.000.
Westin, J. Olle. Horizontal hand weaving loom. 4,109,685, Cl. 139-33.000.
Westinghouse Brake & Signal Co. Ltd.: *See*—
Newson, John Chase; Tregoning, Geoffrey Robinson; and Digby, James Baden, 4,109,416, Cl. 49-316.000.
Westinghouse Electric Corp.: *See*—
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Britton, James S.; and Morgan, David W., 4,110,814, Cl. 361-371.000.
Farish, Owen, 4,110,580, Cl. 200-148.00G.
Fox, Richard Q.; Sigut, Donald E.; and McWhirter, John H., 4,110,825, Cl. 364-492.000.
Freeman, Willie B.; Yeckley, Russell N.; Soles, Otto H.; and Telford, James M., 4,110,578, Cl. 200-148.00F.
Frink, Russell E.; and Milianowicz, Stanislaw A., 4,110,579, Cl. 200-146.00R.
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Hickam, William M., 4,110,613, Cl. 250-282.000.
Larson, Daniel A., 4,110,656, Cl. 313-331.000.
Lin, Kou Chi; and Woods, Edmund E., 4,109,375, Cl. 29-605.000.
Petrosky, Kenneth J., 4,110,725, Cl. 340-5.00R.
Teyssandier, Raymond G., 4,109,523, Cl. 73-194.00A.
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Wetherell, Joseph J.; Fogarty, A. Edward; and Fogarty, Bonnie Rose, to Ned Strongin Associates, Inc. Toy figure glider. 4,109,411, Cl. 46-79.000.
Wevers, Jean: *See*—
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Wheelabrator-Frye Inc.: *See*—
Neidigh, Robert J., 4,109,507, Cl. 73-12.000.
Wheeler, Robert C., to GTE Sylvania Incorporated. Video processing system providing gain control, aperture control, and black level control. 4,110,790, Cl. 358-162.000.
Whetstone, Clayton N.; Koop, Douglas A.; and Dowd, James D., to Aluminum Company of America. Superconductor composite and method of making the same. 4,109,374, Cl. 29-599.000.
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Difley, Charles Rogers; and McDonald, William Roy, 4,109,571, Cl. 100-35.000.
Pearson, Samuel Joseph, 4,109,482, Cl. 62-180.000.
Whisson, Hubert James. Panel erection. 4,109,429, Cl. 52-122.000.
White, Gerald L.: *See*—
Parbhoo, Kantilal R.; Klink, Jerome P.; Calland, John P.; and White, Gerald L., 4,109,610, Cl. 118-202.000.
White, James F.; and Shaw, Wilfrid G., to Standard Oil Company, The. Process for the preparation of unsaturated acids from unsaturated aldehydes. 4,110,369, Cl. 260-530.00N.
White's Electronics, Inc.: *See*—
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Wicker, Gordon R.: *See*—
Jha, Mahesh C.; Wicker, Gordon R.; and Meyer, Gustavo A., 4,110,400, Cl. 423-141.000.
Wickland, Warren A., to General Motors Corporation. Vapor guard system. 4,109,464, Cl. 60-397.000.
Widerby, Lennart, to AB Svenska Flaktfabriken. Ventilation element

with tubular connector for insertion into an opening in a ceiling or a wall. 4,109,564, Cl. 98-40.00N.
Widmyer, Richard H.; and Park, Jack H., to Texaco Inc. Thermal oil recovery method. 4,109,722, Cl. 166-281.000.
Widmyer, Richard H., to Texaco Inc. Thermal oil recovery method. 4,109,723, Cl. 166-303.000.
Wiene, Ole, to Permataet Kobenhavn A/S. Method and a mould for producing an insulating unit, in particular a building unit. 4,110,388, Cl. 264-71.000.
Wiese, Winfred John, to Borg-Warner Corporation. Heat exchanger for shaft seal cartridge. 4,109,920, Cl. 277-17.000.
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Wight, Hewitt G.; Call, Tracey G.; and Mortensen, Marvin L., to California Polytechnic State University Foundation, The. Thiocarbamates. 4,110,444, Cl. 424-226.000.
Wilcox, Dwight R., to United States of America, Navy. Digital bypassable register interface. 4,110,697, Cl. 328-154.000.
Wild, Albrecht: *See*—
Gante, Joachim; Kurmeier, Hans-Adolf; Schacht, Erich; Mehrhof, Werner; Orth, Dieter; Wild, Albrecht; and Simane, Zdenek, 4,110,447, Cl. 424-244.000.
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Wilhelm, Gary L., to Sturm, Warren A. Channel number interface. 4,110,694, Cl. 325-464.000.
Wilhelm, Gerhard; Hockenberger, Lothar; Soyka, Manfred; and Endruscheit, Peter, to Rutgerskwerke Aktiengesellschaft. Storage-stable, moisture curable mixtures containing mercapto-terminated liquid, oligomer, liquid polymer or liquid monomer, liquid oligomer and liquid polymer with sodium chromate. 4,110,295, Cl. 260-30.40R.
Wilkinson, Randolph James: *See*—
Kuhn, Johannes Andries; and Wilkinson, Randolph James, 4,110,428, Cl. 424-46.000.
Wilkinson, Samuel; Flower, Roderick John; and Ferreira, Sergio Henrique, to Burroughs Wellcome Co. Conjugates of prostaglandins, analogs, formulations and their use. 4,110,432, Cl. 424-85.000.
Will, Susanne: *See*—
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Williams, Eddie C. Transmission fluid pressure indicator. 4,110,733, Cl. 340-60.000.
Williams, Edward Lee. Macrame stand. 4,109,946, Cl. 289-18.000.
Williams, Joel; Dunn, Terry; and Stannett, Vivian, to Becton, Dickinson and Company. Irradiation sterilization of semi-crystalline polymers. 4,110,185, Cl. 204-159.200.
Williams, Mark R.; and Martin, Gayle Patrick, to United States of America, Air Force. Balanced AC correlator system. 4,110,833, Cl. 364-819.000.
Williams, Michael D.: *See*—
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Williams, Michael Patrick; and Brawner, William Howard, to H.P.G. IV, Inc. Skateboard chassis. 4,109,925, Cl. 280-11.280.
Williamson, Jim R.; and Gonzalez, Floyd A., to Halliburton Company. Self adjusting liquid spring operating apparatus and method for use in an oil well valve. 4,109,725, Cl. 166-315.000.
Willis, Brian J.; Fischetti, Frank, Jr.; and Eilerman, Robert G., to Fritzsche Dodge & Olcott Inc. Flavoring compositions containing alkyl-2,3-dihydro-3(1'-hydroxyalkylidene)-2-oxo-5-alkyl-furan-4-carboxylates. 4,109,662, Cl. 131-2.000.
Wilson, Bradford W. Skip rope. 4,109,906, Cl. 272-75.000.
Wilson, Clement Card: *See*—
Brown, Leon Calvin; Edwards, Earl Garland; Peterson, Charles Edwin; Robinson, Peter George; and Wilson, Clement Card, 4,110,068, Cl. 432-60.000.
Wilson, Edward A.; and Fredenberg, James D., to Honeywell Information Systems, Inc. Fluid cooling systems for electronic systems. 4,109,707, Cl. 165-46.000.
Wilson, Floyd Leroy. Combination torque release screw and screw driver. 4,109,691, Cl. 145-50.00D.
Wilson, William Richard: *See*—
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Wing, Willis G., to Sperry Rand Corporation. Portable surveying compass with flux valve and gyrocompass alignment modes. 4,109,391, Cl. 33-275.00G.
Winkel, Robert J.: *See*—
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Winstead, Richard L.: *See*—
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Wirt, Leslie Spencer, to Lockheed Aircraft Corporation. Zeno duct sound attenuating means. 4,109,750, Cl. 181-224.000.
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Wisner, Daniel A., to Burroughs Corporation. Return and position control for a DC servo system. 4,110,675, Cl. 318-606.000.
Wisner, Ronald R., to Tecumseh Products Company. Method of making ball and socket joint. 4,109,364, Cl. 29-156.50R.
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Wittenberg, Albert Jan; and van der Velden, Guido J. M., to Oce-van der Grinten N.V. Exposure system for electrophotographic copier. 4,110,040, Cl. 355-70.000.
Woeckener, Willi; Pawelczyk, Werner; and Marquardt, Klaus-Dieter, to Hermann Berstorff Maschinenbau GmbH. Method of controlling operation of a multi-roll calender. 4,110,387, Cl. 264-40.500.
Wohrer, Luis C.: *See*—
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Woitschatzke, Hans; and Geyer, Hennoch, to Trak Sportartikel GmbH. Ski brake. 4,109,931, Cl. 280-605.000.
Wojtowicz, Tadeusz: *See*—
Baker, Lionel Richard; and Wojtowicz, Tadeusz, 4,110,046, Cl. 356-124.000.
Wolber, William George, to Bendix Corporation, The. Multiorifice structure and method of making same. 4,109,870, Cl. 239-558.000.
Wolfe, Merritt W., to Goodyear Tire & Rubber Company, The. Method and patch used in the repair of a pneumatic tire. 4,109,697, Cl. 152-367.000.
Wolfe, Robert W., to GTE Sylvania Incorporated. Luminescent barium-lithium aluminate phosphors and lamp containing the same. 4,110,660, Cl. 313-486.000.
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Wolverine Corporation: *See*—
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Womack, Robert Edward, to Babcock & Wilcox Co., The. Fuel rod leak detector. 4,110,620, Cl. 250-361.00R.
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Sheldon, Roger A.; Been, Peter; Wood, Derek A.; and Mason, Ronald F., 4,110,360, Cl. 260-465.00D.
Wood, James Carlos; and Felcman, Francis Adolph, to Texas Instruments Incorporated. Print ribbon handler. 4,110,050, Cl. 400-248.000.
Wood, Leo A., to Wood, Rollin L., a part interest. Tractor-trailer brake system with improved means for assuring application of trailer brakes concomitantly with tractor brakes. 4,109,968, Cl. 303-7.000.
Wood, Philip. Brake device for a bicycle and the like. 4,109,762, Cl. 188-26.000.
Wood, Prentice J., to Mead Corporation, The. Article carrier. 4,109,849, Cl. 229-52.00B.
Wood, Rollin L.: *See*—
Wood, Leo A., 4,109,968, Cl. 303-7.000.
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Woodward, Robert Burns; and Bickel, Hans, to Ciba-Geigy Corporation. Process for the manufacture of enol derivatives. 4,110,533, Cl. 544-16.000.
Wooler, Alan Metcalf, to Imperial Chemical Industries Limited. Composite bodies or sheets. 4,110,397, Cl. 264-338.000.
Work, John Thompson, to BJ-Hughes Inc. Shock absorbing rotary drive coupling. 4,109,488, Cl. 64-11.00R.
Wright, Howard N., Jr.: *See*—
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Wright, Jesse F. Soil tilling apparatus with pivotal draw frame. 4,109,732, Cl. 172-258.000.
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Wyland, Alvin D., to General Electric Company. Device, method and system for controlling the supply of power to an electrical load. 4,110,632, Cl. 307-117.000.
Wynn Oil Company: *See*—
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Sarid, Dror; and Davis, Thomas G., 4,110,614, Cl. 250-324.000.
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Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., 4,109,903, Cl. 271-3.000.
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Yagi, Norio; Matsumura, Hideki; Aoyagi, Tatsuhiro; and Kishi, Ikuji, to Denki Kagaku Kogyo Kabushiki Kaisha. Process for preparing an aromatic polymer in the presence of an inert nonpolar aromatic reaction lubricant. 4,110,314, Cl. 528-26.000.
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Yajima, Seishi; Hayashi, Josaburo; Omori, Mamoru; Hamano, Masaaki; and Shishido, Toetsu, to Research Institute for Iron, Steel and Other Metals of the Tohoku University, The. Silicon carbide sintered moldings and a method for producing said moldings. 4,110,386, Cl. 264-29.500.
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Yamada, Yasuo; Kamiya, Kazuo; Katayama, Iwao; Motobayashi, Kozo; and Yonemura, Yoshiaki, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Method and device for removing impurities from a spinning rotor of an open-end spinning apparatus. 4,109,451, Cl. 57-56.000.
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Yamamoto, Hirotaka; Sendai, Satoshi; and Ninomiya, Hideaki, to Tokyo Denki Kagaku Kogyo Kabushiki Kaisha (TDK Electronics Co., Ltd.). Electroconductive composite ceramics. 4,110,260, Cl. 252-519.000.
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Yamazaki, Etsuo, to W. L. Gore & Associates, Inc. Production of porous sintered PTFE products. 4,110,392, Cl. 264-127.000.
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Yates, Stephen William, to Platt Saco Lowell. Winding apparatus. 4,109,877, Cl. 242-54.400.
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Yevick, George J., to Izon Corporation. Parallel and series electro-optic viewing and recording apparatus. 4,110,014, Cl. 350-342.000.
Yevick, George J., to Izon Corporation. Doublet lens microfiche construction. 4,110,022, Cl. 353-120.000.
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Dresch, Charles D.; and Yohe, Robert A., 4,110,548, Cl. 13-16.000.
Yokota, Takeshi: *See—*
Konishi, Nobutake; Yokota, Takeshi; Sugawara, Yoshitaka; Yatsuo, Tsutomu; and Okamura, Masahiro, 4,110,781, Cl. 357-39.000.
Yokoyama, Seijiro: *See—*
Matsumoto, Youichi; Tagashira, Yoshimi; and Yokoyama, Seijiro, 4,110,706, Cl. 332-19.000.
Yonemura, Yoshiaki: *See—*
Yamada, Yasuo; Kamiya, Kazuo; Katayama, Iwao; Motobayashi, Kozo; and Yonemura, Yoshiaki, 4,109,451, Cl. 57-56.000.
Yonezawa, Noboru: *See—*
Kondo, Tatsuo; Shindo, Masami; Ohmura, Taizo; Yonezawa, Noboru; Kawagoe, Akira; and Kojima, Toshio, 4,110,110, Cl. 75-122.000.
Yoshida, Chosaku: *See—*
Saikawa, Isamu; Takano, Shuntaro; Yoshida, Chosaku; Takashima, Okuta; Momonoi, Kaishu; Kuroda, Seietsu; Komatsu, Miwako; Yasuda, Takashi; and Kodama, Yutaka, 4,110,327, Cl. 544-385.000.
Yoshida Kogyo K.K.: *See—*
Tanaka, Akira, 4,109,349, Cl. 24-205.11R.
Yoshida, Masazumi: *See—*
Mitsudo, Hiroyuki; and Yoshida, Masazumi, 4,109,633, Cl. 123-169.0EL.
Yoshida, Yasuhiko, to Kabushiki Kaisha Komatsu Seisakusho. Support for loader lift arm. 4,109,807, Cl. 214-131.00R.
Yoshida, Yoshiaki; Suzuki, Osamu; and Onoue, Keizi, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Open-end spinning machine and a method of restarting the same. 4,109,450, Cl. 57-34.00R.
Yoshihara, Tsutomu: *See—*
Shibata, Hiroshi; and Yoshihara, Tsutomu, 4,109,371, Cl. 29-571.000.
Yoshioka, Yoshio: *See—*
Minami, Isao; Yoshioka, Yoshio; and Nomura, Hiroaki, 4,110,537, Cl. 544-313.000.
Youmans, Arthur H., to Dresser Industries, Inc. Method and apparatus for logging inclined earth boreholes using the measured acceleration of the well logging instrument. 4,109,521, Cl. 73-151.000.
Young, Gary C.: *See—*
Martin, William L.; Wahl, Harry A.; and Young, Gary C., 4,109,719, Cl. 166-259.000.
Youngstown Sheet and Tube Company: *See—*
Halsey, Homer P.; Reed, Lowell E.; and Hildebrand, David C., 4,110,824, Cl. 364-472.000.
Younskevicius, Robert E., to United States of America, Energy. Sun meter. 4,110,049, Cl. 356-222.000.
Zabsky, John Mitchell: *See—*
Miller, Gerald Adrian; and Zabsky, John Mitchell, 4,109,756, Cl. 181-266.000.
Zacharin, Alexey T., to United States of America, Army. Spiral orifice dashpot timer. 4,109,455, Cl. 58-1.00R.
Zacks, Phillip H.: *See—*
Gage, Michael H.; and Zacks, Phillip H., 4,109,567, Cl. 99-450.000.
Zahn, Eric H.; and Martin, Philip W., to Sterndent Corp. Method of stippling, and stippling mandrel therefor. 4,109,385, Cl. 32-59.000.
Zahnd, Hans, to Hasler AG. Wireless paging receiver. 4,110,743, Cl. 340-311.000.
Zann, Annie: *See—*
Abert-Mellah, Marie Annick; Dubois, Jean Claude; and Zann, Annie, 4,110,243, Cl. 252-299.000.
Zannucci, Joseph S.; and Hedberg, David G., Jr., to Eastman Kodak Company. Polyester fiber dye stabilization. 4,110,301, Cl. 260-40.00P.
Zaucha, Charles D. Gas rifle. 4,109,557, Cl. 89-7.000.
Zechnall, Richard; and Baumann, Gunther, to Robert Bosch GmbH. Injection control system for an internal combustion engine. 4,109,616, Cl. 123-32.0EA.
Zeigler, James Richard; and Sauter, Daniel S. Tiltable trap chamber with stack aiding feature. 4,109,830, Cl. 222-143.000.
Zelacolor Systems Establishment: *See—*
Guillaume, Emile Armand Henri, 4,110,036, Cl. 355-32.000.
Zelonis, Paul Thomas. Binary reagent system for detecting drugs of abuse. 4,110,078, Cl. 23-230.00R.
Zentmyer, John Hobart. Night stick structure. 4,109,912, Cl. 273-84.00R.
Ziegler, Geza C.: *See—*
Spanel, Abram N.; Eiland, P. Frank; Jacobs, David R.; and Ziegler, Geza C., 4,109,594, Cl. 112-79.00R.
Ziegler, James Francis: *See—*
Cairns, James Anthony; Lurio, Allen; and Ziegler, James Francis, 4,110,625, Cl. 250-492.00A.
Zimmermann, Anton: *See—*
Fahrni, Fritz; and Zimmermann, Anton, 4,109,611, Cl. 118-325.000.
Zimmermann, Wolfgang: *See—*
Schindler, Hermann; and Zimmermann, Wolfgang, 4,110,494, Cl. 427-385.00R.

Zinn, Robert W., to Knox Manufacturing Company. Portable movie screen device. 4,110,003, Cl. 350-117.000.

Zirkelbach, Albert W.: *See*—

Wedge, Donald G.; and Zirkelbach, Albert W., 4,109,845, Cl. 227-144.000.

Zito, Anthony A. Weight lifting apparatus. 4,109,907, Cl. 272-117.000.

Zmiarovich, Thomas George, to Raymond Lee Organization, Inc., The. Air stabilized water mattress. 4,109,333, Cl. 5-368.000.

Zorner, Karl-Heinz, to H. Maihak AG. Method of compensating for carrier-gas-composition dependence due to the collision-broadening effect in non-dispersive infrared photometers having a detector comprised of two absorption chambers arranged one behind the other. 4,110,619, Cl. 250-344.000.

Zottl, Anton, to Siemens Aktiengesellschaft. Pulse radar device with phase- or frequency-modulation. 4,110,755, Cl. 343-17.2PC.

# LIST OF REISSUE PATENTEES

TO WHOM

## PATENTS WERE ISSUED ON THE 29TH DAY OF AUGUST, 1978

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Albright & Wilson Ltd.: *See*—
Gyllenspetz, Jeffrey; and Renton, Stanley, Re. 29,749, Cl. 204-43.00T.

Biram, Brian Edgar Lund, to C.C.L. Systems Limited. Cable attachments. Re. 29,743, Cl. 61-45.00B.

Black Clawson Company, The: *See*—
Couture, Joseph Walter, Re. 29,746, Cl. 241-15.000.

C.C.L. Systems Limited: *See*—
Biram, Brian Edgar Lund, Re. 29,743, Cl. 61-45.00B.

Cooke, Robert E.: *See*—
Roe, Kenneth W.; Studwell, Ernest E.; and Cooke, Robert E., Re. 29,747, Cl. 417-54.000.

Couture, Joseph Walter, to Black Clawson Company, The. Apparatus for pulping waste paper materials. Re. 29,746, Cl. 241-15.000.

Fichter, Harry L., Jr.; and Lewis, James M., to Horizons Incorporated a division of Horizons Research Incorporated. Dry working black image compositions comprising organic halogen compounds and ethylene compounds. Re. 29,748, Cl. 96-27.00E.

Gomi, Yoshifumi, to Shinshu Seiki Kabushiki Kaisha; and Kabushiki Kaisha Suwa Seikosha. Printer. Re. 29,745, Cl. 101-93.290.

Gyllenspetz, Jeffrey; and Renton, Stanley, to Albright & Wilson Ltd. Trivalent chromium electroplating baths and electroplating therefrom. Re. 29,749, Cl. 204-43.00T.

Horizons Incorporated a division of Horizons Research Incorporated: *See*—
Fichter, Harry L., Jr.; and Lewis, James M., Re. 29,748, Cl. 96-27.00E.

Kabushiki Kaisha Suwa Seikosha: *See*—
Gomi, Yoshifumi, Re. 29,745, Cl. 101-93.290.

Lewis, James M.: *See*—
Fichter, Harry L., Jr.; and Lewis, James M., Re. 29,748, Cl. 96-27.00E.

Minnesota Mining and Manufacturing Company: *See*—
Tung, Chi Fang, Re. 29,742, Cl. 2-412.000.

Nash Engineering Company: *See*—
Roe, Kenneth W.; Studwell, Ernest E.; and Cooke, Robert E., Re. 29,747, Cl. 417-54.000.

Patriquin, George P. Key controlled security apparatus. Re. 29,744, Cl. 70-364.00R.

Renton, Stanley: *See*—
Gyllenspetz, Jeffrey; and Renton, Stanley, Re. 29,749, Cl. 204-43.00T.

Roe, Kenneth W.; Studwell, Ernest E.; and Cooke, Robert E., to Nash Engineering Company. Liquid ring pump lobe purge. Re. 29,747, Cl. 417-54.000.

Shinshu Seiki Kabushiki Kaisha: *See*—
Gomi, Yoshifumi, Re. 29,745, Cl. 101-93.290.

Studwell, Ernest E.: *See*—
Roe, Kenneth W.; Studwell, Ernest E.; and Cooke, Robert E., Re. 29,747, Cl. 417-54.000.

Tung, Chi Fang, to Minnesota Mining and Manufacturing Company. Retroreflective protective helmet. Re. 29,742, Cl. 2-412.000.

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# LIST OF PLANT PATENTEES

Merrill, Grant, deceased; and by Merrill, Lucile B., executrix. Peach tree. 4,295, 8-29-78, Cl. 43.000.

Merrill, Lucile B., executrix: *See*—
Merrill, Grant, deceased; and Merrill, Lucile B., executrix, 4,295, Cl. 43.000.

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# LIST OF DESIGN PATENTEES

Acme General Corporation: *See*—
Jerila, Torsti T. T., 249,120, Cl. D8-341.000.

Actus, Inc.: *See*—
Mueller, Anthony A., 249,159, Cl. D24-7.000.

Ajax Hardware Corporation: *See*—
Gorton, Howard Byron, 249,119, Cl. D8-341.000.

Aktiebolaget Optimus: *See*—
Folke, William Albert, 249,113, Cl. D7-110.000.

Amba Marketing Systems, Inc.: *See*—
Siegel, Milton L., 249,186, Cl. D87-3.00D.

American Home Products Corp. (Del.): *See*—
Stoy, Raymond P., 249,157, Cl. D23-150.000.

Aqua-Mist, Inc.: *See*—
Morrow, William B., 249,158, Cl. D23-158.000.

Backstrom, Olof, to Oy Fiskars AB. Scissors. 249,117, 8-29-78, Cl. D8-57.000.

Barr, Josef J. Pendant or similar article. 249,131, 8-29-78, Cl. D11-81.000.

Barr, Josef J. Pendant or similar article. 249,132, 8-29-78, Cl. D11-81.000.

Barr, Josef J. Pendant or similar article. 249,133, 8-29-78, Cl. D11-81.000.

Barr, Josef J. Pendant or similar article. 249,134, 8-29-78, Cl. D11-81.000.

Barr, Josef J. Pendant or similar article. 249,135, 8-29-78, Cl. D11-81.000.

Be A Doll, Inc.: *See*—
Rubin, Suzann Audrey, 249,171, Cl. D34-4.00R.

Bendix Corporation, The: *See*—
Oberg, Gustave Albert, 249,124, Cl. D10-64.000.

Bjornsson, Sturlaugur. Holder for hanging stockings and socks. 249,122, 8-29-78, Cl. D9-191.000.

Bocade, Emil J., to Keeler Corporation. Combined furniture pull and escutcheon. 249,118, 8-29-78, Cl. D8-301.000.

Boecher, Walter, Jr. Holder for cards or the like. 249,191, 8-29-78, Cl. D96-12.00A.

Boecher, Walter, Jr. Holder for cards or the like. 249,192, 8-29-78, Cl. D96-12.00A.

Boecher, Walter, Jr. Holder for cards or the like. 249,193, 8-29-78, Cl. D96-12.00A.

Brooks, Teddar S.: *See*—
Zimbardi, Dominic J.; and Brooks, Teddar S., 249,106, Cl. D6-86.000.
Zimbardi, Dominic J.; and Brooks, Teddar S., 249,156, Cl. D23-140.000.

Butler, Jimmie L. Utility trailer. 249,138, 8-29-78, Cl. D12-105.000.

Caltime Products Corp.: *See*—
Wright, Irvin E.; and Magnussen, Robert O., Jr., 249,125, Cl. D10-40.000.

Cannon, Thomas C., Jr. Table tray attachment. 249,108, 8-29-78, Cl. D6-199.000.

Carlson, Robert C., to Gulf Development, Inc. Movable lettering advertising display. 249,194, 8-29-78, Cl. D96-12.00R.

Carroll, James C.; and Johnson, Lewis T., to Phillips Petroleum Company. Bakery container or the like. 249,185, 8-29-78, Cl. D87-1.00R.

Coca-Cola Company, The: *See*—
Geyer, Gary, 249,111, Cl. D7-15.000.

Coleman, David L. Holder for attaching to a tennis racket or similar article. 249,173, 8-29-78, Cl. D34-5.0ST.

Crowley, Henry J.: *See—*
Garson, Howard P.; and Crowley, Henry J., 249,112, Cl. D7-43.000.

Dart Industries Inc.: *See—*
Haynes, Rodney R., Sr., 249,104, Cl. D6-63.000.

Davis, Lee W.: *See—*
Doughty, Kenneth Lynn; Davis, Lee W.; and Yost, Gary R., 249,149, Cl. D15-7.000.

Dogliotti, Amilcare, to P. Ferrero & C. S.p.A. Display carton. 249,123, 8-29-78, Cl. D9-224.000.

Doman, Donald W., to Kohler Co. Faucet handle. 249,155, 8-29-78, Cl. D23-28.000.

Doughty, Kenneth Lynn; Davis, Lee W.; and Yost, Gary R., to Little Giant Corporation. Suspended pump. 249,149, 8-29-78, Cl. D15-7.000.

Driscoll, Neil J. Push button control station. 249,140, 8-29-78, Cl. D13-32.000.

Eastman Kodak Company: *See—*
Swayze, Samuel Franklin, 249,151, Cl. D16-06.000.

Enns, Irvin. Puppet bird. 249,170, 8-29-78, Cl. D34-2.00A.

Fardigs, Jan, to Joons Plastprodukter. Skate guard. 249,175, 8-29-78, Cl. D34-14.00B.

Fisher, Gerald C.: *See—*
Scanland, Joseph E.; and Fisher, Gerald C., 249,150, Cl. D15-17.000.

Fishman, Martin B. Earring. 249,129, 8-29-78, Cl. D11-48.000.

Fishman, Martin B. Earring. 249,130, 8-29-78, Cl. D11-62.000.

Flanigan, Charles Dennis; Mazzei, Randall John; and Noel, Howard Strudwick, to International Business Machines Corporation. Scanner unit. 249,144, 8-29-78, Cl. D14-40.000.

Folke, William Albert, to Aktiebolaget Optimus. Base for a camp stove. 249,113, 8-29-78, Cl. D7-110.000.

Fowler, Catalina. Bathing suit. 249,096, 8-29-78, Cl. D2-40.000.

Fulet Enterprise Co., Ltd.: *See—*
Lin, Jing-Jong, 249,139, Cl. D13-4.000.

Furukawa, June. Lure. 249,154, 8-29-78, Cl. D22-27.000.

Garson, Howard P.; and Crowley, Henry J. Cake mold. 249,112, 8-29-78, Cl. D7-43.000.

General Electric Company: *See—*
Pitstick, Martin H.; and Schmitt, Charles H., 249,126, Cl. D10-60.000.

Geyer, Gary, to Coca-Cola Company, The. Beverage tumbler. 249,111, 8-29-78, Cl. D7-15.000.

Glasenapp, Jorg: *See—*
Glasenapp, Werner; and Glasenapp, Jorg, 249,181, Cl. D48-24.00A.

Glasenapp, Werner; and Glasenapp, Jorg, to Union Sils, van de Loo & Co. Bicycle lamp. 249,181, 8-29-78, Cl. D48-24.00A.

Glaubinger, Martin; and Wilson, John, to Rolodex Corporation. Telephone list finder. 249,153, 8-29-78, Cl. D19-76.000.

Gorton, Howard Byron, to Ajax Hardware Corporation. Door or window lock. 249,119, 8-29-78, Cl. D8-341.000.

Grant, Paul E. Swimming pool form. 249,164, 8-29-78, Cl. D25-98.000.

Greer, Michael M. Pocket finger exercise board. 249,182, 8-29-78, Cl. D56-1.00R.

Gulf Development, Inc.: *See—*
Carlson, Robert C., 249,194, Cl. D96-12.00R.

Guodace, Frank K.: *See—*
Knope, William J.; and Guodace, Frank K., 249,114, Cl. D7-137.000.

Hallden, Lars-Erik, to Interfeudor S.A. Lighter for smokers. 249,165, 8-29-78, Cl. D27-42.000.

Hargrove, Wilma Rae. Box for school supplies. 249,184, 8-29-78, Cl. D87-1.00R.

Harvey, Paul C.: *See—*
Walker, Gentle James, 249,169, Cl. D30-6.000.

Hauptman, Paul F.: *See—*
Hovda, Peggy L.; and Hauptman, Paul F., 249,167, Cl. D28-57.000.

Haynes, Rodney R., Sr., to Dart Industries Inc. Sofa. 249,104, 8-29-78, Cl. D6-63.000.

Hovda, Peggy L.; and Hauptman, Paul F., to Unique Industries, Inc. Fingernail file. 249,167, 8-29-78, Cl. D28-57.000.

Hoyt, Charles F. Shallow water craft. 249,137, 8-29-78, Cl. D12-62.000.

Industrial Promotional Toys, Inc.: *See—*
Loomis, James F., 249,176, Cl. D34-15.0HH.
Loomis, James F., 249,177, Cl. D34-15.0HH.
Loomis, James F., 249,178, Cl. D34-15.0HH.
Loomis, James F., 249,179, Cl. D34-15.0HH.

Infanti, Giuseppe. Convertible seat. 249,105, 8-29-78, Cl. D6-64.000.

Interfeudor S.A.: *See—*
Hallden, Lars-Erik, 249,165, Cl. D27-42.000.

International Business Machines Corporation: *See—*
Flanigan, Charles Dennis; Mazzei, Randall John; and Noel, Howard Strudwick, 249,144, Cl. D14-40.000.

International Silver Company: *See—*
Knope, William J.; and Guodace, Frank K., 249,114, Cl. D7-137.000.

Jensen, George B., to Syracuse China Corp. Dinner plate or similar article. 249,109, 8-29-78, Cl. D7-1.000.

Jerila, Torsti T. T., to Acme General Corporation. Door latch. 249,120, 8-29-78, Cl. D8-341.000.

Johnson, Lewis T.: *See—*
Carroll, James C.; and Johnson, Lewis T., 249,185, Cl. D87-1.00R.

Joons Plastprodukter: *See—*
Fardigs, Jan, 249,175, Cl. D34-14.00B.

Katz, Adele S.: *See—*
Struble, Rose L.; and Katz, Adele S., 249,101, Cl. D6-20.000.

Keeler Corporation: *See—*
Bocade, Emil J., 249,118, Cl. D8-301.000.

Ketcham & McDougall, Inc.: *See—*
Macowski, William, 249,152, Cl. D19-73.000.

Knope, William J.; and Guodace, Frank K., to International Silver Company. Article of flatware. 249,114, 8-29-78, Cl. D7-137.000.

Koda, Hironosuke: *See—*
Okada, Takao; Murakami, Tsutomu; and Koda, Hironosuke, 249,142, Cl. D14-5.000.

Kohler Co.: *See—*
Doman, Donald W., 249,155, Cl. D23-28.000.

Krasicki, Walter. Harp. 249,183, 8-29-78, Cl. D56-1.00A.

Landau, Harolyn S.: *See—*
Landau, Paul H.; and Landau, Harolyn S., 249,145, Cl. D14-59.000.

Landau, Paul H.; and Landau, Harolyn S. Telephone accessory adapter. 249,145, 8-29-78, Cl. D14-59.000.

Lin, Jing-Jong, to Fulet Enterprise Co., Ltd. Matching transformer. 249,139, 8-29-78, Cl. D13-4.000.

Little Giant Corporation: *See—*
Doughty, Kenneth Lynn; Davis, Lee W.; and Yost, Gary R., 249,149, Cl. D15-7.000.

Lombard, Edwin L.: *See—*
Nickerson, Thomas D.; and Lombard, Edwin L., 249,098, Cl. D2-315.000.

Loomis, James F., to Industrial Promotional Toys, Inc. Toy airplane. 249,176, 8-29-78, Cl. D34-15.0HH.

Loomis, James F., to Industrial Promotional Toys, Inc. Toy airplane. 249,177, 8-29-78, Cl. D34-15.0HH.

Loomis, James F., to Industrial Promotional Toys, Inc. Toy airplane. 249,178, 8-29-78, Cl. D34-15.0HH.

Loomis, James F., to Industrial Promotional Toys, Inc. Toy airplane. 249,179, 8-29-78, Cl. D34-15.0HH.

Lutron Electronics Co., Inc.: *See—*
Mayo, Noel, 249,141, Cl. D13-32.000.

Macowski, William, to Ketcham & McDougall, Inc. Pencil sharpener. 249,152, 8-29-78, Cl. D19-73.000.

Magnussen, Robert O., Jr.: *See—*
Wright, Irvin E.; and Magnussen, Robert O., Jr., 249,125, Cl. D10-40.000.

Matsushita Electric Industrial Co., Ltd.: *See—*
Miyamoto, Isshin, 249,147, Cl. D14-73.000.
Miyamoto, Isshin, 249,148, Cl. D14-73.000.
Okada, Takao; Murakami, Tsutomu; and Koda, Hironosuke, 249,142, Cl. D14-5.000.
Toyoda, Hiroshi, 249,160, Cl. D24-36.000.

Mayo, Noel, to Lutron Electronics Co., Inc. Remote dimming control. 249,141, 8-29-78, Cl. D13-32.000.

Mazzei, Randall John: *See—*
Flanigan, Charles Dennis; Mazzei, Randall John; and Noel, Howard Strudwick, 249,144, Cl. D14-40.000.

McElroy, John O., Jr. Emblem. 249,136, 8-29-78, Cl. D11-105.000.

Meredith, Donald E. Game counter. 249,174, 8-29-78, Cl. D34-5.0MM.

Mills, Kenneth Wilson, to Vernon & Co. (Pulp Products) Ltd. Disposable bedpan. 249,162, 8-29-78, Cl. D24-57.000.

Minnesota Mining & Manufacturing Company: *See—*
Sweet, Lawrence A., 249,168, Cl. D29-7.000.

Mitutoyo Manufacturing Company, Ltd.: *See—*
Yamamoto, Takeshi, 249,127, Cl. D10-73.000.

Miyamoto, Isshin, to Matsushita Electric Industrial Co., Ltd. Digital clock radio. 249,147, 8-29-78, Cl. D14-73.000.

Miyamoto, Isshin, to Matsushita Electric Industrial Co., Ltd. Digital clock radio. 249,148, 8-29-78, Cl. D14-73.000.

Morrow, William B., to Aqua-Mist, Inc. Attic ventilator. 249,158, 8-29-78, Cl. D23-158.000.

Mueller, Anthony A., to Actus, Inc. Modular track assembly for 200-unit biological sample changer. 249,159, 8-29-78, Cl. D24-7.000.

Murakami, Tsutomu: *See—*
Okada, Takao; Murakami, Tsutomu; and Koda, Hironosuke, 249,142, Cl. D14-5.000.

Namba Press Yogyo Kabushiki Kaisha: *See—*
Nanba, Kunio; and Ogawa, Taro, 249,100, Cl. D6-9.000.

Nanba, Kunio; and Ogawa, Taro, to Namba Press Yogyo Kabushiki Kaisha. Safety chair for a child for use in motor vehicles. 249,100, 8-29-78, Cl. D6-9.000.

Newmark, Edward H. Cup for administering medicine or the like. 249,110, 8-29-78, Cl. D7-6.000.

Nickerson, Thomas D.; and Lombard, Edwin L., to Textron Inc. Shoe closure device. 249,098, 8-29-78, Cl. D2-315.000.

Noel, Howard Strudwick: *See—*
Flanigan, Charles Dennis; Mazzei, Randall John; and Noel, Howard Strudwick, 249,144, Cl. D14-40.000.

Nortexport, S.A. de C.V.: *See—*
Rodriguez, Sergio, 249,103, Cl. D6-55.000.
Rodriguez, Sergio, 249,107, Cl. D6-146.000.

Oberg, Gustave Albert, to Bendix Corporation, The. Stud checker tool. 249,124, 8-29-78, Cl. D10-64.000.

Ogawa, Taro: *See—*
Nanba, Kunio; and Ogawa, Taro, 249,100, Cl. D6-9.000.

Ohtomo, Kazuhito, to Sansui Electric Co., Ltd. Record player. 249,143, 8-29-78, Cl. D14-17.000.

Okada, Takao; Murakami, Tsutomu; and Koda, Hironosuke, to Matsushita Electric Industrial Co., Ltd. Combined portable cassette recorder and radio. 249,142, 8-29-78, Cl. D14-5.000.

Owens-Illinois, Inc.: *See—*
Strand, Gordon A., 249,121, Cl. D9-101.000.

Oy Fiskars AB: *See—*
Backstrom, Olof, 249,117, Cl. D8-57.000.
P. Ferrero & C. S.p.A.: *See—*
Dogliotti, Amilcare, 249,123, Cl. D9-224.000.
Pelly, Charles W., to Sears Manufacturing Company. Vehicle seat. 249,102, 8-29-78, Cl. D6-48.000.
Phillips Petroleum Company: *See—*
Carroll, James C.; and Johnson, Lewis T., 249,185, Cl. D87-1.00R.
Pitstick, Martin H.; and Schmitt, Charles H., to General Electric Company. Food probe handle. 249,126, 8-29-78, Cl. D10-60.000.
Rahaim, Sarah E. Convertible skirt and short pants garment or the like. 249,097, 8-29-78, Cl. D2-28.000.
Rodriguez, Sergio, to Nortexport, S.A. de C.V. Chair. 249,103, 8-29-78, Cl. D6-55.000.
Rodriguez, Sergio, to Nortexport, S.A. de C.V. Table. 249,107, 8-29-78, Cl. D6-146.000.
Rohrig, Peter. Infant pacifier. 249,161, 8-29-78, Cl. D24-45.000.
Rolodex Corporation: *See—*
Glaubinger, Martin; and Wilson, John, 249,153, Cl. D19-76.000.
Roper Corporation: *See—*
Scanland, Joseph E.; and Fisher, Gerald C., 249,150, Cl. D15-17.000.
Rubin, Suzann Audrey, to Be A Doll, Inc. Doll. 249,171, 8-29-78, Cl. D34-4.00R.
Sandusky City-Erie County Department of Health: *See—*
Waldron, Robert D., 249,115, Cl. D7-192.000.
Sansui Electric Co., Ltd.: *See—*
Ohtomo, Kazuhito, 249,143, Cl. D14-17.000.
Tabata, Hiroshi, 249,146, Cl. D14-71.000.
Scanland, Joseph E.; and Fisher, Gerald C., to Roper Corporation. Cutter pin for mower. 249,150, 8-29-78, Cl. D15-17.000.
Schmitt, Charles H.: *See—*
Pitstick, Martin H.; and Schmitt, Charles H., 249,126, Cl. D10-60.000.
Sears Manufacturing Company: *See—*
Pelly, Charles W., 249,102, Cl. D6-48.000.
Siegel, Milton I., to Amba Marketing Systems, Inc. Handbag. 249,186, 8-29-78, Cl. D87-3.00D.
Stewart, Scott. Back pack. 249,187, 8-29-78, Cl. D87-5.00R.
Stewart, Scott. Back pack. 249,188, 8-29-78, Cl. D87-5.00R.
Stewart, Scott. Back pack. 249,189, 8-29-78, Cl. D87-5.00R.
Stewart, Scott. Back pack. 249,190, 8-29-78, Cl. D87-5.00R.
Stookey, David M. Measuring tape reel holder. 249,128, 8-29-78, Cl. D10-74.000.
Stoy, Raymond P., to American Home Products Corp. (Del.). Deodorant container or the like. 249,157, 8-29-78, Cl. D23-150.000.
Strand, Gordon A., to Owens-Illinois, Inc. Jar. 249,121, 8-29-78, Cl. D9-101.000.
Strathman, Arthur. Seed separator. 249,166, 8-29-78, Cl. D27-51.000.
Struble, Rose L.; and Katz, Adele S. Jewelry display stand. 249,101, 8-29-78, Cl. D6-20.000.
Swayze, Samuel Franklin, to Eastman Kodak Company. Still camera. 249,151, 8-29-78, Cl. D16-06.000.
Sweet, Lawrence A., to Minnesota Mining & Manufacturing Company. Softcap respirator hood. 249,168, 8-29-78, Cl. D29-7.000.
Syracuse China Corp.: *See—*
Jensen, George B., 249,109, Cl. D7-1.000.
Tabata, Hiroshi, to Sansui Electric Co., Ltd. Tuner. 249,146, 8-29-78, Cl. D14-71.000.
Taylor, Charles H. Liquid cosmetic applicator. 249,099, 8-29-78, Cl. D4-20.000.
Textron Inc.: *See—*
Nickerson, Thomas D.; and Lombard, Edwin L., 249,098, Cl. D2-315.000.
Toyoda, Hiroshi, to Matsushita Electric Industrial Co., Ltd. Face massager. 249,160, 8-29-78, Cl. D24-36.000.
Union Sils, van de Loo & Co.: *See—*
Glasenapp, Werner; and Glasenapp, Jorg, 249,181, Cl. D48-24.00A.
Unique Industries, Inc.: *See—*
Hovda, Peggy L.; and Hauptman, Paul F., 249,167, Cl. D28-57.000.
Upshaw, Dale E. Wheel guide. 249,172, 8-29-78, Cl. D34-5.0HP.
Vanbragt, Willy H. Combined candles and container therefor. 249,180, 8-29-78, Cl. D48-2.000.
Vanderbloemen, Clement J. Can opener for opening dual aperture pop-top cans. 249,116, 8-29-78, Cl. D8-18.000.
Vernon & Co. (Pulp Products) Ltd.: *See—*
Mills, Kenneth Wilson, 249,162, Cl. D24-57.000.
Waldron, Robert D., to Sandusky City-Erie County Department of Health. Garbage can or similar article. 249,115, 8-29-78, Cl. D7-192.000.
Walker, Gentle James, to Harvey, Paul C., a part interest. Aquarium tank. 249,169, 8-29-78, Cl. D30-6.000.
Wallace, Milton A. Interlocking wall unit. 249,163, 8-29-78, Cl. D25-80.000.
Wilson, John: *See—*
Glaubinger, Martin; and Wilson, John, 249,153, Cl. D19-76.000.
Winckler, Patrick Marie. Visual display holder for attachment to the shafts of mechanical ski-tow equipment and on the safety bars of ski chair-lift equipment. 249,195, 8-29-78, Cl. D96-12.00R.
Wright, Irvin E.; and Magnussen, Robert O., Jr., to Caltime Products Corp. Automatic pill reminder or similar article. 249,125, 8-29-78, Cl. D10-40.000.
Yamamoto, Takeshi, to Mitutoyo Manufacturing Company, Ltd. Inside micrometer. 249,127, 8-29-78, Cl. D10-73.000.
Yost, Gary R.: *See—*
Doughty, Kenneth Lynn; Davis, Lee W.; and Yost, Gary R., 249,149, Cl. D15-7.000.
Zimbardi, Dominic J.; and Brooks, Teddar S. Combined spray can holder and switch for an air filtering system. 249,106, 8-29-78, Cl. D6-86.000.
Zimbardi, Dominic J.; and Brooks, Teddar S. Combined fan and filter for an air filtering system. 249,156, 8-29-78, Cl. D23-140.000.

# CLASSIFICATION OF PATENTS

## ISSUED AUGUST 29, 1978

NOTE.—First number, class; second number, subclass; third number, patent number

**CLASS 2**

| | |
|---|---|
| 10 | 4,109,320 |
| 91 | 4,109,321 |
| 177 | 4,109,322 |
| 410 | 4,109,323 |
| 412 | Re.29,742 |

**CLASS 4**

| | |
|---|---|
| 172.12 | 4,109,325 |
| 172.19 | 4,109,324 |
| 173 R | 4,109,326 |
| 252 R | 4,109,327 |

**CLASS 5**

| | |
|---|---|
| 2 R | 4,109,328 |
| 61 | 4,109,329 |
| 267 | 4,109,330 |
| 284 | 4,109,331 |
| 337 | 4,109,332 |
| 368 | 4,109,333 |

**CLASS 8**

| | |
|---|---|
| 2.5 R | 4,110,070 |
| 21 R | 4,110,071 |
| 25 | 4,110,072 |
| 85 R | 4,110,073 |
| 111 | 4,110,074 |
| 137 | 4,110,075 |

**CLASS 12**

| | |
|---|---|
| 59.5 | 4,109,334 |
| 123 | 4,109,335 |

**CLASS 13**

| | |
|---|---|
| 6 | 4,110,545 |
| 11 | 4,110,546 |
| | 4,110,547 |
| 16 | 4,110,548 |

**CLASS 15**

| | |
|---|---|
| 3 | 4,109,336 |
| 21 D | 4,109,337 |
| 105 | 4,109,338 |
| 167 R | 4,109,339 |
| 321 | 4,109,340 |
| 340 | 4,109,341 |
| 373 | 4,109,342 |

**CLASS 16**

| | |
|---|---|
| 98 | 4,109,343 |
| 144 | 4,109,344 |
| 149 | 4,109,345 |
| 151 | 4,109,346 |

**CLASS 17**

| | |
|---|---|
| 23 | 4,109,347 |

**CLASS 23**

| | |
|---|---|
| 230 B | 4,110,077 |
| 230 R | 4,110,078 |
| 230.6 | 4,110,076 |
| 253 TP | 4,110,079 |
| 273 SP | 4,110,080 |
| 288 G | 4,110,081 |

**CLASS 24**

| | |
|---|---|
| 153 | 4,109,348 |
| 205.11 R | 4,109,349 |
| 249 LS | 4,109,350 |
| 258 | 4,109,351 |

**CLASS 26**

| | |
|---|---|
| 15 R | 4,109,352 |

**CLASS 28**

| | |
|---|---|
| 104 | 4,109,353 |
| 119 | 4,109,354 |
| 151 | 4,109,355 |
| 279 | 4,109,356 |
| 289 | 4,109,357 |

**CLASS 29**

| | |
|---|---|
| 2 | 4,109,358 |
| 25.35 | 4,109,359 |
| 26 A | 4,109,360 |
| 148.4 C | 4,109,361 |
| 156.4 R | 4,109,362 |
| 156.5 R | 4,109,364 |
| 243.56 | 4,109,363 |
| 421 R | 4,109,365 |
| 427 | 4,109,366 |
| 436 | 4,109,367 |
| 446 | 4,109,368 |
| 467 | 4,109,369 |
| 566.3 | 4,109,370 |
| 571 | 4,109,371 |
| | 4,109,372 |
| 588 | 4,109,373 |
| 599 | 4,109,374 |
| 605 | 4,109,375 |
| 622 | 4,109,376 |
| 626 | 4,109,377 |
| 629 | 4,109,378 |
| 747 | 4,109,379 |

**CLASS 30**

| | |
|---|---|
| 162 | 4,109,380 |
| 228 | 4,109,381 |

**CLASS 32**

| | |
|---|---|
| 10 A | 4,109,382 |
| | 4,109,383 |
| 40 R | 4,109,384 |
| 59 | 4,109,385 |

**CLASS 33**

| | |
|---|---|
| 178 F | 4,109,386 |
| 185 V | 4,109,387 |
| 265 | 4,109,390 |
| 275 G | 4,109,391 |
| 287 | 4,109,388 |
| 363 K | 4,109,389 |
| 381 | 4,109,392 |

**CLASS 34**

| | |
|---|---|
| 22 | 4,109,393 |
| 57 B | 4,109,394 |
| 93 | 4,109,395 |
| 192 | 4,109,396 |
| 239 | 4,109,397 |

**CLASS 35**

| | |
|---|---|
| 13 | 4,109,398 |
| 26 | 4,109,399 |

**CLASS 37**

| | |
|---|---|
| 126 AC | 4,109,400 |

**CLASS 42**

| | |
|---|---|
| 50 | 4,109,401 |
| 65 | 4,109,402 |
| 75 B | 4,109,403 |

**CLASS 43**

| | |
|---|---|
| 17 | 4,109,404 |
| 17.5 | 4,109,405 |
| 84 | 4,109,406 |
| 85 | 4,109,407 |
| 112 | 4,109,408 |

**CLASS 44**

| | |
|---|---|
| 50 | 4,110,082 |

**CLASS 46**

| | |
|---|---|
| 25 | 4,109,409 |
| 44 | 4,109,410 |
| 79 | 4,109,411 |
| 216 | 4,109,412 |
| 233 | 4,109,413 |

**CLASS 47**

| | |
|---|---|
| 58 | 4,109,414 |
| 67 | 4,109,415 |

**CLASS 49**

| | |
|---|---|
| 316 | 4,109,416 |
| 352 | 4,109,417 |

**CLASS 51**

| | |
|---|---|
| 34 F | 4,109,418 |
| 94 R | 4,109,419 |
| 105 R | 4,109,420 |
| 288 | 4,109,421 |
| 295 | 4,110,083 |
| 307 | 4,110,084 |
| 308 | 4,110,085 |
| 325 | 4,109,422 |

**CLASS 52**

| | |
|---|---|
| 1 | 4,109,423 |
| 2 | 4,109,424 |
| 21 | 4,109,425 |
| 35 | 4,109,426 |
| 58 R | 4,109,427 |
| 94 | 4,109,428 |
| 122 | 4,109,429 |
| 127 | 4,109,430 |
| 172 | 4,109,431 |
| | 4,109,432 |
| 199 | 4,109,433 |
| 287 | 4,109,434 |
| 309.1 | 4,109,435 |
| 309.2 | 4,109,436 |
| 536 | 4,109,437 |
| 630 | 4,109,438 |
| 667 | 4,109,439 |
| 721 | 4,109,440 |

**CLASS 53**

| | |
|---|---|
| 11 | 4,109,441 |
| 29 | 4,109,442 |
| 118 | 4,109,443 |
| 186 | 4,109,444 |
| 198 R | 4,109,445 |
| 282 | 4,109,446 |

**CLASS 55**

| | |
|---|---|
| 7 | 4,110,086 |
| 73 | 4,110,087 |
| 90 | 4,110,088 |
| 178 | 4,110,089 |

**CLASS 56**

| | |
|---|---|
| 13.3 | 4,109,447 |
| 13.5 | 4,109,448 |
| 328 R | 4,109,449 |

**CLASS 57**

| | |
|---|---|
| 34 R | 4,109,450 |
| 56 | 4,109,451 |
| 58.89 | 4,109,452 |
| 58.91 | 4,109,453 |
| 58.95 | 4,109,454 |

**CLASS 58**

| | |
|---|---|
| 1 R | 4,109,455 |
| 23 AC | 4,109,456 |
| 43 | 4,109,457 |
| 63 | 4,109,458 |

**CLASS 60**

| | |
|---|---|
| 39.66 | 4,109,459 |
| 204 | 4,109,460 |
| 274 | 4,109,461 |
| 278 | 4,109,462 |
| 282 | 4,109,463 |
| 397 | 4,109,464 |
| 398 | 4,109,465 |
| 487 | 4,109,466 |
| 534 | 4,109,467 |
| 670 | 4,109,468 |
| 676 | 4,109,469 |
| 685 | 4,109,470 |

**CLASS 61**

| | |
|---|---|
| 0.5 | 4,109,471 |
| 45 B | Re.29,743 |
| 45 D | 4,109,472 |
| | 4,109,473 |
| 48 | 4,109,474 |
| 53.5 | 4,109,475 |
| 86 | 4,109,478 |
| 87 | 4,109,476 |
| | 4,109,477 |
| 94 | 4,109,479 |
| 114 | 4,109,480 |

**CLASS 62**

| | |
|---|---|
| 54 | 4,110,091 |
| 64 | 4,110,092 |
| 140 | 4,109,481 |
| 180 | 4,109,482 |
| 256 | 4,109,484 |
| 298 | 4,109,485 |
| 402 | 4,109,486 |
| 474 | 4,109,487 |

**CLASS 64**

| | |
|---|---|
| 11 R | 4,109,488 |

**CLASS 65**

| | |
|---|---|
| 2 | 4,110,090 |
| 3 C | 4,110,094 |
| 3 R | 4,110,093 |
| 26 | 4,110,095 |
| 30 R | 4,110,096 |
| 136 | 4,110,097 |
| 141 | 4,110,098 |

**CLASS 66**

| | |
|---|---|
| 75.2 | 4,109,489 |
| 120 | 4,109,490 |
| 125 R | 4,109,491 |
| 172 E | 4,109,492 |

**CLASS 68**

| | |
|---|---|
| 27 | 4,109,493 |
| 200 | 4,109,483 |

**CLASS 70**

| | |
|---|---|
| 107 | 4,109,494 |
| 364 R | Re.29,744 |
| 365 | 4,109,495 |
| 380 | 4,109,496 |
| 403 | 4,109,497 |
| 449 | 4,109,498 |

**CLASS 71**

| | |
|---|---|
| 76 | 4,110,099 |
| 86 | 4,110,100 |
| 88 | 4,110,101 |
| 89 | 4,110,102 |
| 92 | 4,110,103 |
| 94 | 4,110,104 |
| 95 | 4,110,105 |

**CLASS 72**

| | |
|---|---|
| 181 | 4,109,499 |
| 203 | 4,109,500 |
| 327 | 4,109,501 |
| 349 | 4,109,502 |
| 352 | 4,109,503 |
| 407 | 4,109,504 |

**CLASS 73**

| | |
|---|---|
| 1 R | 4,109,505 |
| 10 | 4,109,506 |
| 12 | 4,109,507 |
| 15 FD | 4,109,508 |
| 23 | 4,109,509 |
| 27 R | 4,109,510 |
| 37.6 | 4,109,511 |
| 40.5 R | 4,109,512 |
| 49.1 | 4,109,513 |
| 58 | 4,109,514 |
| 88 A | 4,109,515 |
| 93 | 4,109,516 |
| 119 A | 4,109,517 |
| | 4,109,518 |
| 135 | 4,109,519 |
| 143 | 4,109,520 |
| 151 | 4,109,521 |
| 154 | 4,109,522 |
| 194 A | 4,109,523 |
| 194 B | 4,109,524 |
| 201 | 4,109,525 |
| 231 R | 4,109,526 |
| 253 | 4,109,528 |
| 343.5 | 4,109,527 |
| 427 | 4,109,530 |
| 438 | 4,109,531 |
| 457 | 4,109,532 |
| 498 | 4,109,533 |
| 503 | 4,109,534 |
| 706 | 4,109,535 |
| 756 | 4,109,536 |
| | 4,109,537 |

**CLASS 74**

| | |
|---|---|
| 6 | 4,109,538 |
| 36 | 4,109,539 |
| 96 | 4,109,540 |
| 194 | 4,109,541 |
| 230.8 | 4,109,542 |
| 231 P | 4,109,543 |
| 242.7 | 4,109,544 |
| 388 R | 4,109,529 |
| 447 | 4,109,545 |
| 474 | 4,109,546 |
| 526 | 4,109,547 |
| 569 | 4,109,548 |
| 573 F | 4,109,549 |
| 691 | 4,109,550 |
| 705 | 4,109,551 |
| 813 L | 4,109,552 |

**CLASS 75**

| | |
|---|---|
| 1 R | 4,110,106 |
| 24 | 4,110,107 |
| 48 | 4,110,108 |
| 109 | 4,110,109 |
| 122 | 4,110,110 |
| 134 A | 4,110,111 |

**CLASS 81**

| | |
|---|---|
| 9.51 | 4,109,553 |

**CLASS 83**

| | |
|---|---|
| 565 | 4,109,554 |
| 700 | 4,109,555 |

**CLASS 85**

| | |
|---|---|
| 84 | 4,109,556 |

**CLASS 89**

| | |
|---|---|
| 7 | 4,109,557 |
| 191 A | 4,109,558 |
| 195 | 4,109,559 |

**CLASS 90**

| | |
|---|---|
| 96 | 4,109,560 |

**CLASS 91**

| | |
|---|---|
| 451 | 4,109,561 |

**CLASS 96**

| | |
|---|---|
| 1 PC | 4,110,112 |
| 27 E | Re.29,748 |
| 29 D | 4,110,113 |
| 36 | 4,110,114 |
| 84 A | 4,110,115 |
| 101 | 4,110,116 |

**CLASS 98**

| | |
|---|---|
| 2.19 | 4,109,562 |
| 40 C | 4,109,563 |
| 40 N | 4,109,564 |

**CLASS 99**

| | |
|---|---|
| 283 | 4,109,565 |
| 358 | 4,109,566 |
| 450 | 4,109,567 |
| 477 | 4,109,568 |
| 483 | 4,109,569 |
| 551 | 4,109,570 |

**CLASS 100**

| | |
|---|---|
| 35 | 4,109,571 |

**CLASS 101**

| | |
|---|---|
| 37 | 4,109,572 |
| 38 R | 4,109,573 |
| 93.29 | Re.29,745 |
| 216 | 4,109,574 |

**CLASS 102**

| | |
|---|---|
| 22 R | 4,109,575 |
| 24 HC | 4,109,576 |
| 35.6 | 4,109,577 |
| 39 | 4,109,578 |
| 41 | 4,109,579 |
| 52 | 4,109,580 |
| 92.1 | 4,109,581 |
| 93 | 4,109,582 |
| 244 | 4,109,583 |

**CLASS 104**

| | |
|---|---|
| 130 | 4,109,584 |

**CLASS 105**

| | |
|---|---|
| 197 DB | 4,109,585 |
| 224 A | 4,109,586 |
| 490 | 4,109,587 |

**CLASS 106**

| | |
|---|---|
| 1.17 | 4,110,117 |
| 25 | 4,110,118 |
| 38.24 | 4,110,119 |
| 99 | 4,110,120 |
| 100 | 4,110,121 |

**CLASS 108**

| | |
|---|---|
| 12 | 4,109,588 |
| 63 | 4,109,589 |

**CLASS 110**

| | |
|---|---|
| 235 | 4,109,590 |

**CLASS 112**

| | |
|---|---|
| 76 | 4,109,591 |
| 79 A | 4,109,592 |
| | 4,109,593 |
| 79 R | 4,109,594 |
| 121.11 | 4,109,595 |
| | 4,109,596 |
| 158 E | 4,109,597 |

**CLASS 113**

| | |
|---|---|
| 116 HH | 4,109,598 |
| 121 C | 4,109,599 |
| 121 R | 4,109,600 |

**CLASS 114**

| | |
|---|---|
| 218 | 4,109,602 |
| 230 | 4,109,603 |
| 270 | 4,109,604 |
| 314 | 4,109,601 |

**CLASS 116**

| | |
|---|---|
| 22 A | 4,109,605 |
| 94 | 4,109,606 |
| 129 A | 4,109,607 |
| 137 R | 4,109,608 |

**CLASS 118**

| | |
|---|---|
| 50 | 4,109,609 |
| 202 | 4,109,610 |
| 325 | 4,109,611 |
| 417 | 4,109,612 |

**CLASS 122**

| | |
|---|---|
| 1 R | 4,109,613 |
| 149 | 4,109,614 |

**CLASS 123**

| | |
|---|---|
| 32 EA | 4,109,616 |
| 32 EE | 4,109,615 |
| 41.74 | 4,109,617 |
| 43 C | 4,109,618 |
| 52 M | 4,109,620 |
| 52 R | 4,109,619 |
| 65 SP | 4,109,621 |
| 73 A | 4,109,622 |
| 119 A | 4,109,624 |
| | 4,109,625 |
| 119 EC | 4,109,623 |
| 139 AW | 4,109,626 |
| 140 R | 4,109,627 |
| | 4,109,628 |
| | 4,109,629 |
| 148 CA | 4,109,631 |
| 148 E | 4,109,630 |
| | 4,109,632 |
| 169 EL | 4,109,633 |
| 198 F | 4,109,634 |

**CLASS 125**

| | |
|---|---|
| 10 | 4,109,635 |

**CLASS 126**

| | |
|---|---|
| 21 A | 4,109,636 |
| 197 | 4,109,637 |
| 271 | 4,109,638 |
| | 4,109,639 |
| | 4,109,640 |
| 299 D | 4,109,641 |

**CLASS 128**

| | |
|---|---|
| 2 L | 4,109,643 |
| 2 V | 4,109,642 |
| | 4,109,644 |
| 2.05 C | 4,109,646 |
| 2.05 F | 4,109,647 |
| 2.06 E | 4,109,648 |
| 2.1 Z | 4,109,645 |
| 57 | 4,109,649 |
| 66 | 4,109,650 |
| 145.8 | 4,109,651 |
| 212 | 4,109,652 |
| 218 R | 4,109,653 |
| 235 | 4,109,654 |
| 253 | 4,109,655 |
| 266 | 4,109,656 |
| 283 | 4,109,657 |
| 340 | 4,109,658 |
| 349 R | 4,109,659 |
| 419 R | 4,109,660 |
| 582 | 4,109,661 |

**CLASS 131**

| | |
|---|---|
| 2 | 4,109,662 |
| | 4,109,663 |
| | 4,109,664 |
| 15 C | 4,109,665 |
| 261 B | 4,109,666 |

**CLASS 132**

| | |
|---|---|
| 33 R | 4,109,667 |

**CLASS 133**

| | |
|---|---|
| 8 R | 4,109,668 |

**CLASS 136**

| | |
|---|---|
| 89 HY | 4,110,123 |
| 89 P | 4,110,122 |

236 R 4,110,124

**CLASS 137**

101.19 4,109,669
119 4,109,670
282 4,109,671
315 4,109,672
381 4,109,673
493.9 4,109,674
494 4,109,675
550 4,109,676
586 4,109,677
596.13 4,109,679
596.2 4,109,678
599 4,109,680
615 4,109,681
625.23 4,109,682
625.3 4,109,683

**CLASS 138**

97 4,109,684

**CLASS 139**

33 4,109,685

**CLASS 141**

1 4,109,686
5 4,109,687
387 4,109,688

**CLASS 144**

2 Z 4,109,689
163 4,109,690

**CLASS 145**

50 D 4,109,691

**CLASS 148**

1.5 4,110,125
4,110,126
6.15 R 4,110,129
6.15 Z 4,110,127
4,110,128
11.5 N 4,110,131
11.5 P 4,110,130
32 4,110,132
171 4,110,133

**CLASS 149**

2 4,110,134
19.4 4,110,135
47 4,110,136

**CLASS 150**

52 R 4,109,692

**CLASS 151**

41.75 4,109,693
69 4,109,694

**CLASS 152**

347 4,109,695
354 R 4,109,696
367 4,109,697

**CLASS 156**

48 4,110,137
63 4,110,138
79 4,110,139
87 4,110,140
123 R 4,110,141
159 4,110,142
167 4,110,143
173 4,110,144
218 4,110,145
291 4,110,146
306 4,110,147
359 4,110,148
429 4,110,149
499 4,110,150
519 4,110,151
553 4,110,152
633 4,110,153

**CLASS 157**

1.2 4,109,698

**CLASS 162**

36 4,110,154
135 4,110,155
305 4,110,156

**CLASS 164**

244 4,109,699
426 4,109,700

**CLASS 165**

1 4,109,701
4,109,702
4,109,703
16 4,109,704
17 4,109,705
32 4,109,706
46 4,109,707
48 R 4,109,708
105 4,109,709
165 4,109,710
170 4,109,711

**CLASS 166**

53 4,109,713
4,109,714
177 4,109,715
191 4,109,716
250 4,109,717
256 4,109,718
259 4,109,719
269 4,109,720
280 4,109,721
281 4,109,722
303 4,109,723
315 4,109,724
4,109,725
4,109,728
340 4,109,712

**CLASS 169**

11 4,109,726
41 4,109,727

**CLASS 172**

1 4,109,729
54 4,109,730
59 4,109,731
258 4,109,732

**CLASS 173**

4 4,109,733
114 4,109,734
163 4,109,735

**CLASS 174**

16 HS 4,110,549
19 4,110,550
27 4,110,551
35 MS 4,110,552
42 4,110,553
101.5 4,110,554

**CLASS 175**

297 4,109,736
329 4,109,737

**CLASS 176**

36 C 4,110,157
58 PB 4,110,158
68 4,110,159
78 4,110,160

**CLASS 177**

212 4,109,738

**CLASS 178**

3 4,110,555
19 4,110,556
69.1 4,110,557
4,110,558

**CLASS 179**

1 D 4,110,559
1 VC 4,110,560
2 EA 4,110,561
15 BW 4,110,563
15 BY 4,110,562
15.55 T 4,110,564
18 AH 4,110,565
18 GF 4,110,566
84 A 4,110,569
84 VF 4,110,567
4,110,568
156 R 4,110,583
170 J 4,110,570
175.1 A 4,110,571
175.3 R 4,110,572

**CLASS 180**

5 R 4,109,739
8 A 4,109,740
20 4,109,742
21 4,109,741
65 C 4,109,743
68 P 4,109,744
77 H 4,109,745
82 A 4,109,746
140 4,109,747
141 4,109,748

**CLASS 181**

224 4,109,750
230 4,109,749
247 4,109,751
252 4,109,752
4,109,753
4,109,754
256 4,109,755
266 4,109,756
401 4,109,757

**CLASS 182**

19 4,109,759
48 4,109,760
92 4,109,761

**CLASS 184**

15 A 4,109,758

**CLASS 188**

26 4,109,762
32 4,109,763
72.4 4,109,764
72.7 4,109,765
73.4 4,109,766
315 4,109,767

**CLASS 191**

22 R 4,109,768

**CLASS 192**

0.092 4,109,772
5 4,109,769
12 BA 4,109,770
83 4,109,771
111 A 4,109,773

**CLASS 194**

1 C 4,109,774
10 4,109,775

**CLASS 195**

1.8 4,110,161
31 P 4,110,162
62 4,110,163
63 4,110,164
80 R 4,110,165
96 4,110,166
127 4,110,167

**CLASS 198**

466 4,109,780
485 4,109,781
781 4,109,782
4,109,783
821 4,109,784

**CLASS 200**

67 DA 4,110,573
67 G 4,110,574
81.9 R 4,110,575
82 E 4,110,576
146 R 4,110,579
148 F 4,110,578
148 G 4,110,580
153 LA 4,110,581
153 SC 4,110,582
304 4,110,584
305 4,110,585

**CLASS 201**

4 4,110,168
6 4,110,169

**CLASS 202**

160 4,110,170
234 4,110,172
241 4,110,171
248 4,110,173

**CLASS 203**

11 4,110,174

**CLASS 204**

43 T Re.29,749
52 R 4,110,176
59 F 4,110,177
64 R 4,110,178
67 4,110,179
128 4,110,180
147 4,110,181
157.1 R 4,110,182
4,110,183
159.19 4,110,187
159.2 4,110,185
159.20 4,110,186
159.22 4,110,188
159.23 4,110,184
180 P 4,110,175
180 R 4,110,189
224 M 4,110,190
266 4,110,191

**CLASS 206**

1.5 4,109,785
45.14 4,109,786
150 4,109,787
326 4,109,876
329 4,109,788
404 4,109,789
446 4,109,790
506 4,109,791
525 4,109,792

**CLASS 208**

8 4,110,192
11 LE 4,110,194
4,110,195
11 R 4,110,193
13 4,110,196
64 4,110,197
111 4,110,198
139 4,110,199
4,110,200
4,110,201
144 4,110,202
216 4,110,203
251 R 4,110,204
255 4,110,205

**CLASS 209**

43 4,110,206
74 R 4,109,793
166 4,110,207

**CLASS 210**

44 4,110,209
4,110,210
47 4,110,211
53 4,110,212
59 4,110,213
77 4,110,214
114 4,110,215
156 4,110,216
175 4,110,217
222 4,110,222
223 4,110,218
245 4,110,219
321 R 4,110,220
388 4,110,223
425 4,110,208
481 4,110,221

**CLASS 211**

13 4,109,794
57.1 4,109,795
60 R 4,109,796
126 4,109,797

**CLASS 212**

39 R 4,109,798
83 4,109,799

**CLASS 214**

2.5 4,109,800
6 FS 4,109,801
8.5 D 4,109,803
8.5 F 4,109,802
16.1 CB 4,109,804
16.4 A 4,109,805
38 CC 4,109,806
131 R 4,109,807
152 4,109,808
505 4,109,809
4,109,810
506 4,109,811
762 4,109,812

**CLASS 215**

1 C 4,109,813
217 4,109,814
232 4,109,815
256 4,109,816

**CLASS 219**

10.43 4,110,586
10.49 R 4,110,587
4,110,588
66 4,110,589
75 4,110,590
85 CA 4,110,591
85 M 4,110,592
90 4,110,593
101 4,110,577
121 LM 4,110,594
121 P 4,110,595
124.4 4,110,596
200 4,110,597
216 4,110,598
301 4,110,599
364 4,110,600
506 4,110,601
523 4,110,602
535 4,110,603

**CLASS 220**

90.2 4,109,817
200 4,109,818
208 4,109,819
240 4,109,820
337 4,109,821
404 4,109,822
446 4,109,823

**CLASS 221**

7 4,109,824
14 4,109,825
72 4,109,826

**CLASS 222**

1 4,109,827
3 4,109,828
81 4,109,829
143 4,109,830
254 4,109,831
318 4,109,832
386.5 4,109,833
448 4,109,834
449 4,109,835
494 4,109,836
556 4,109,837

**CLASS 223**

91 4,109,838

**CLASS 224**

29 R 4,109,839

**CLASS 225**

2 4,109,840
96.5 4,109,841
98 4,109,842

**CLASS 226**

109 4,109,843

**CLASS 227**

120 4,109,844
144 4,109,845

**CLASS 228**

4.5 4,109,846
119 4,109,847

**CLASS 229**

21 4,109,848
52 B 4,109,849
72 4,109,850
92.8 4,109,851

**CLASS 233**

1 R 4,109,852
2 4,109,853
25 4,109,854
4,109,855

**CLASS 235**

92 PC 4,110,604
308 4,109,856
378 4,109,857
432 4,110,606

**CLASS 237**

8 R 4,109,858
69 4,109,859

**CLASS 238**

349 4,109,860

**CLASS 239**

15 4,109,861
102 4,109,862
4,109,863
127.3 4,109,864
147 4,109,865
233 4,109,866
265.15 4,109,867
413 4,109,868
491 4,109,869
558 4,109,870

**CLASS 241**

15 Re.29,746
24 4,109,871
46.11 4,109,872
56 4,109,873
69 4,109,874
101.7 4,109,875

**CLASS 242**

54.4 4,109,877
68.3 4,109,878
82 4,109,879
84.21 R 4,109,880
107.4 A 4,109,881
217 4,109,882

**CLASS 244**

3.1 4,109,883
3.22 4,109,884
7 R 4,109,885
178 4,109,886

**CLASS 248**

345.1 4,109,887
443 4,109,888
447 4,109,889
449 4,109,892
452 4,109,890
503.1 4,109,891

**CLASS 249**

175 4,109,893

**CLASS 250**

201 4,110,607
214 A 4,110,608
231 R 4,110,609
231 SE 4,110,610
237 R 4,110,611
281 4,110,612
282 4,110,613
324 4,110,614
328 4,110,615
338 4,110,616
342 4,110,617
343 4,110,618
344 4,110,619
361 R 4,110,620
4,110,621
396 R 4,110,622
398 4,110,623
481 4,110,624
492 A 4,110,625
561 4,110,627

**CLASS 251**

30 4,109,894
41 4,109,895

**CLASS 252**

8.5 C 4,110,226
4,110,231
8.5 LC 4,110,225
8.55 B 4,110,232
8.55 D 4,110,224
4,110,228
4,110,229
8.9 4,110,227
41 4,110,233
47.5 4,110,234
51.5 R 4,110,235
62.54 4,110,236
79.4 4,110,237
89 B 4,110,238
135 4,110,239
182 4,110,240
182.1 4,110,241
186 4,110,242
299 4,110,243
300 4,110,244
4,110,245
301.28 4,110,246
313 R 4,110,247
429 B 4,110,248
431 R 4,110,249
432 4,110,250
442 4,110,251
4,110,252
455 Z 4,110,255
457 4,110,253
462 4,110,254
465 4,110,256
466 J 4,110,257
468 4,110,258
514 4,110,259
519 4,110,260
522 4,110,261
4,110,626
545 4,110,262
4,110,263
855 R 4,110,230

**CLASS 254**

144 4,109,896

**CLASS 260**

2.3 4,110,266
14 4,110,275
17 A 4,110,278
19 R 4,110,279
22 A 4,110,281
23 AR 4,110,282
4,110,283
29.2 EP 4,110,287
29.2 TN 4,110,284
4,110,286
29.4 UA 4,110,288
29.6 MP 4,110,285
29.6 RW 4,110,290
4,110,291
4,110,292
29.6 TA 4,110,289
29.7 R 4,110,293
30.2 4,110,294
30.4 R 4,110,295
30.6 R 4,110,296
33.4 P 4,110,297
37 PC 4,110,299
37 SB 4,110,300
40 P 4,110,301
40 R 4,110,302
42.18 4,110,303
45.75 C 4,110,308
45.8 N 4,110,304
4,110,305
4,110,306
45.9 KA 4,110,307
112 R 4,110,320
112.5 R 4,110,321
4,110,322
239.3 A 4,110,323
239.5 4,110,324
239.55 C 4,110,325
239.55 R 4,110,326
270 A 4,110,329
287 B 4,110,330
293.57 4,110,333
293.66 4,110,334
293.77 4,110,331
299 4,110,332
302 S 4,110,335
307 G 4,110,336
308 D 4,110,338
308 R 4,110,337
326.5 FL 4,110,340
326.9 4,110,339
327 C 4,110,341
332.2 A 4,110,342

335 4,110,343
340 4,110,298
340.3 4,110,344
340.5 R 4,110,345
345.2 4,110,347
4,110,348
345.5 4,110,346
346.74 4,110,349
346.75 4,110,350
347.2 4,110,351
348.14 4,110,354
348.29 4,110,352
369 4,110,353
372 4,110,355
404.5 4,110,358
412.5 4,110,356
448 A 4,110,357
449.5 4,110,359
465 D 4,110,360
4,110,361
4,110,362
4,110,363
505 C 4,110,365
505 N 4,110,366
511 4,110,367
514 D 4,110,368
530 N 4,110,369
4,110,370
531 C 4,110,371
540 4,110,372
543 R 4,110,373
555 A 4,110,374
558 S 4,110,378
559 R 4,110,375
570 R 4,110,376
583 R 4,110,377
584 R 4,110,379
586 C 4,110,380
590 C 4,110,381
4,110,382
4,110,383
4,110,384
603 R 4,110,403
604 HF 4,110,404
646 4,110,405
653.4 4,110,406
4,110,407
4,110,408
666 PY 4,110,409
683.15 B 4,110,410
841 4,110,277
873 4,110,411
4,110,412
879 4,110,413
897 A 4,110,414
953 4,110,415

**CLASS 261**

23 A 4,110,416
39 A 4,110,417
98 4,110,418
142 4,110,419

**CLASS 264**

13 4,110,385
22 4,110,280
29.5 4,110,386
40.5 4,110,387
41 4,110,420
71 4,110,388
89 4,110,389
90 4,110,390
120 4,110,391
127 4,110,392
132 4,110,393
167 4,110,394
210 R 4,110,395
236 4,110,396
338 4,110,397

**CLASS 266**

120 4,109,897
217 4,109,898

**CLASS 267**

140 4,109,899

**CLASS 269**

102 4,109,900
290 4,109,901

**CLASS 270**

79 4,109,902

**CLASS 271**

3 4,109,903

**CLASS 272**

56.5 R 4,109,904
71 4,109,905
75 4,109,906
117 4,109,907
119 4,109,908
146 4,109,909

**CLASS 273**

29 BB 4,109,910
31 4,109,911
84 R 4,109,912
86 B 4,109,913
101 4,109,914
106.5 R 4,109,915
121 A 4,109,916
254 4,109,917
256 4,109,918

**CLASS 274**

9 B 4,109,919

**CLASS 277**

17 4,109,920
24 4,109,921
34.3 4,109,922
101 4,109,923
165 4,109,924

**CLASS 280**

11.28 4,109,925
39 4,109,926
250 4,109,927
411 R 4,109,928
432 4,109,929
491 B 4,109,930
605 4,109,931
615 4,109,932
653 4,109,933
716 4,109,934
747 4,109,935

**CLASS 282**

11.5 A 4,109,936
27.5 4,109,937

**CLASS 283**

43 4,109,938

**CLASS 285**

8 4,109,939
18 4,109,940
111 4,109,941
140 4,109,942
149 4,109,943
323 4,109,945
373 4,109,944

**CLASS 289**

18 4,109,946

**CLASS 290**

1 R 4,110,628
38 R 4,110,629
53 4,110,630
55 4,110,631

**CLASS 292**

76 4,109,947
169.15 4,109,948
189 4,109,949
254 4,109,950

**CLASS 293**

65 4,109,951

**CLASS 294**

16 4,109,952
118 4,109,953

**CLASS 296**

23 A 4,109,954
37.1 4,109,955
78 R 4,109,956
95 C 4,109,957

**CLASS 297**

191 4,109,958
216 4,109,959
258 4,109,960
338 4,109,961
385 4,109,962

**CLASS 298**

23 M 4,109,963

**CLASS 299**

2 4,109,964

**CLASS 300**

7 4,109,965

**CLASS 302**

50 4,109,966

**CLASS 303**

6 C 4,109,967
7 4,109,968
22 R 4,109,969
116 4,109,970

**CLASS 305**

51 4,109,971

**CLASS 307**

117 4,110,632
205 4,110,633
213 4,110,634
233 R 4,110,635
237 4,110,636
238 4,110,637
252 C 4,110,638
279 4,110,639
303 4,110,640
355 4,110,641

**CLASS 308**

3 R 4,109,972
4,109,973
8.2 4,109,974
26 4,109,975
36.1 4,109,976
174 4,109,977
237 R 4,109,978
238 4,109,979

**CLASS 310**

51 4,110,642
54 4,110,643
91 4,110,644
154 4,110,645
163 4,110,646
168 4,110,647
178 4,110,648
191 4,110,649
239 4,110,650
4,110,651
261 4,110,652
313 4,110,653
323 4,110,654
344 4,110,655

**CLASS 312**

35 4,109,980
107 4,109,981
183 4,109,982
214 4,109,983
236 4,109,984
262 4,109,985

**CLASS 313**

143 4,110,667
331 4,110,656
332 4,110,657
344 4,110,658
398 4,110,659
486 4,110,660
499 4,110,661

**CLASS 315**

169 TV 4,110,662
4,110,663
4,110,664
4,110,665
408 4,110,666

**CLASS 318**

78 4,110,668
212 4,110,670
227 4,110,671
254 4,110,672
466 4,110,673
571 4,110,674
606 4,110,675

**CLASS 322**

31 4,110,676

**CLASS 323**

19 4,110,677
22 SC 4,110,678

**CLASS 324**

0.5 A 4,110,681
0.5 B 4,110,680
3 4,110,679
10 4,110,682
52 4,110,683
4,110,684
58 B 4,110,685
58.5 C 4,110,686
133 4,110,687
208 4,110,688
254 4,110,689

**CLASS 325**

25 4,110,690
41 4,110,691
147 4,110,692
419 4,110,693
464 4,110,694
4,110,695
480 4,110,696

**CLASS 328**

154 4,110,697
164 4,110,698
168 4,110,699

**CLASS 329**

103 4,110,700

**CLASS 331**

1 A 4,110,701
94.5 F 4,110,702
94.5 P 4,110,703
113 R 4,110,704

**CLASS 332**

11 D 4,110,705
19 4,110,706
4,110,707
21 4,110,708

**CLASS 333**

6 4,110,709
10 4,110,710
32 4,110,711
33 4,110,712
70 R 4,110,713
72 4,110,714
73 S 4,110,715
97 R 4,110,716

**CLASS 335**

22 4,110,717
296 4,110,718

**CLASS 337**

46 4,110,719
319 4,110,720

**CLASS 338**

128 4,110,721
174 4,110,722

**CLASS 339**

17 L 4,109,986
75 M 4,109,987
89 M 4,109,990
91 R 4,109,988
94 M 4,109,989
99 R 4,109,991
147 R 4,109,992
176 M 4,109,993

**CLASS 340**

1 R 4,110,723
4 A 4,110,724
5 R 4,110,725
6 R 4,110,726
10 4,110,727
15.5 DP 4,110,728
15.5 MC 4,110,729
16 R 4,110,730
17 R 4,110,731
58 4,110,732
60 4,110,733
64 4,110,734
146.1 AQ 4,110,735
146.3 AE 4,110,736
146.3 Q 4,110,737
309.1 4,110,742
311 4,110,743
336 4,110,744
347 AD 4,110,745
347 NT 4,110,746
4,110,747
365 C 4,110,748
4,110,749
384 E 4,110,750
539 4,110,738
573 4,110,741
605 4,110,739
620 4,110,740

**CLASS 343**

7.3 4,110,756
7.4 4,110,752
8 4,110,753
16 R 4,110,754
17.2 PC 4,110,755
700 MS 4,110,751
715 4,110,757

**CLASS 346**

74.1 4,110,758
75 4,110,759

**CLASS 350**

3.66 4,109,996
23 4,109,997
4,109,998
91 4,109,999
96.21 4,109,994
4,110,000
96.23 4,110,001
96.29 4,110,002
117 4,110,003
162 SF 4,110,004
184 4,110,005
186 4,110,006
189 4,109,995
215 4,110,007
255 4,110,008
292 4,110,009
4,110,010
301 4,110,011
302 4,110,012
310 4,110,013
342 4,110,014
357 4,110,015
358 4,110,016

**CLASS 352**

5 4,110,017
130 4,110,018
188 4,110,019

**CLASS 353**

26 A 4,110,020
27 R 4,110,021
120 4,110,022
122 4,110,023

**CLASS 354**

1 4,110,760
4 4,110,762
14 4,110,763
51 4,110,764
59 4,110,765
106 4,110,766
152 4,110,767
173 4,110,768
195 4,110,769
202 4,110,770
207 4,110,771
246 4,110,772
252 4,110,773
345 4,110,774

**CLASS 355**

3 R 4,110,026
3 SH 4,110,025
3 TR 4,110,024
4,110,027
8 4,110,028
10 4,110,029
11 4,110,030
14 4,110,031
4,110,032
4,110,033
15 4,110,034
4,110,035
32 4,110,036
48 4,110,037
50 4,110,038
68 4,110,039
70 4,110,040
75 4,110,041

**CLASS 356**

4 4,110,042
102 4,110,043
103 4,110,044
106 LR 4,110,045
124 4,110,046
200 4,110,047
4,110,048
222 4,110,049

**CLASS 357**

15 4,110,775
23 4,110,776
24 4,110,777
30 4,110,778
34 4,110,779
38 4,110,780
39 4,110,781
48 4,110,782
67 4,110,783

**CLASS 358**

4 4,110,761
8 4,110,784
19 4,110,785
22 4,110,786
34 4,110,787
63 4,110,788
148 4,110,789
162 4,110,790
233 4,110,791
240 4,110,792
248 4,110,793
256 4,110,794
260 4,110,795
298 4,110,796

**CLASS 360**

17 4,110,797
65 4,110,798
70 4,110,799
74 4,110,800
96 4,110,801
106 4,110,802
109 4,110,803
118 4,110,804
132 4,110,805

**CLASS 361**

4 4,110,806
42 4,110,807
44 4,110,808
95 4,110,809
213 4,110,810
225 4,110,811
248 4,110,812
4,110,813
371 4,110,814
433 4,110,815
4,110,816
4,110,817

**CLASS 362**

32 4,110,818
40 4,110,819
207 4,110,820

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141 4,110,821

**CLASS 364**

200 4,110,822
4,110,823
4,110,830
463 4,110,605
472 4,110,824
492 4,110,825
526 4,110,826
550 4,110,827
562 4,110,828
577 4,110,829
745 4,110,831
786 4,110,832
819 4,110,833
841 4,110,834
844 4,110,835
860 4,110,836
900 4,110,837

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2 4,110,838
180 4,110,839
203 4,110,840
205 4,110,841
233 4,110,842

**CLASS 366**

76 4,110,844
83 4,110,843

**CLASS 400**

124 4,109,776
4,109,777
154.2 4,109,778
248 4,110,050
584 4,109,779

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157 4,110,051
295 4,110,052
361 4,110,053
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203.5 4,110,055

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230 4,110,056

**CLASS 417**

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109 4,110,057
395 4,110,058
424 4,110,059
462 4,110,060
477 4,110,061

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112 4,110,399
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365 4,110,424
648 R 4,110,425

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166 4,110,437
177 4,110,438
181 4,110,439
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256 4,110,455
263 4,110,456
4,110,457
4,110,458
267 4,110,459
270 4,110,460
273 R 4,110,461
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4,110,463
274 4,110,464
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4,110,466
280 4,110,467
301 4,110,468
304 4,110,469
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330 4,110,471
4,110,472
331 4,110,473
350 4,110,474

**CLASS 425**

71 4,110,062

**CLASS 426**

2 4,110,475
41 4,110,476
46 4,110,477
262 4,110,478
277 4,110,479
436 4,110,480
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497 4,110,482
542 4,110,483
582 4,110,484
595 4,110,485

**CLASS 427**

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4,110,487
84 4,110,488
164 4,110,489
180 4,110,490
212 4,110,491
214 4,110,492
233 4,110,493
385 R 4,110,494
400 4,110,495

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35 4,110,498
4,110,499
4,110,500
40 4,110,501
4,110,502
64 4,110,503
97 4,110,504
114 4,110,505
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151 4,110,507
190 4,110,497
240 4,110,508
276 4,110,509
285 4,110,510
307 4,110,511
469 4,110,512
500 4,110,496
528 4,110,513
683 4,110,514

**CLASS 429**

104 4,110,515
4,110,516
133 4,110,517
174 4,110,518
217 4,110,519

**CLASS 431**

125 4,110,063
171 4,110,064
255 4,110,065
320 4,110,066
346 4,110,067

**CLASS 432**

60 4,110,068
258 4,110,069

**CLASS 521**

30 4,110,265
59 4,110,267
4,110,273
63 4,110,264
81 4,110,269
111 4,110,271
4,110,272
121 4,110,270
123 4,110,276
157 4,110,274
177 4,110,268

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17 4,110,319
27 4,110,520
64 4,110,521
68 4,110,316
105 4,110,522
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158 4,110,524
177 4,110,525
214 4,110,526
235 4,110,527
283 4,110,528

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73 4,110,318
77 4,110,317
90 4,110,313
119 4,110,309
4,110,310
170 4,110,364
215 4,110,311
4,110,312
294 4,110,315
491 4,110,529

**CLASS 536**

9 4,110,530
4,110,531

**CLASS 542**

426 4,110,532

**CLASS 544**

16 4,110,533
4,110,534
21 4,110,535
139 4,110,536
313 4,110,537
380 4,110,328
385 4,110,327

**CLASS 560**

11 4,110,538
240 4,110,539

**CLASS 568**

718 4,110,540
725 4,110,541
729 4,110,542
781 4,110,543
805 4,110,544

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| 4 : | 4,109,565 | | 4,110,823 | | 4,109,933 | | 4,110,269 | | 4,110,194 | | 4,110,174 |
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| | 4,109,707 | | 4,109,576 | | 4,109,960 | | 4,110,317 | | 4,109,320 | | 4,110,198 |
| | 4,110,679 | | 4,109,684 | | 4,109,997 | | 4,110,342 | | 4,109,321 | | 4,110,199 |
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| | 4,109,415 | | 4,110,041 | | 4,110,167 | | 4,110,575 | | 4,109,441 | | 4,110,218 |
| | 4,109,484 | | 4,110,132 | | 4,110,182 | | 4,110,628 | | 4,109,467 | | 4,110,268 |
| | 4,109,510 | | 4,110,234 | | 4,110,210 | | 4,110,808 | | 4,109,469 | | 4,110,292 |
| | 4,109,512 | | 4,110,792 | | 4,110,236 | 10 : | 4,110,251 | | 4,109,518 | | 4,110,325 |
| | 4,109,522 | 01 : | 4,110,135 | | 4,110,266 | | 4,110,254 | | 4,109,519 | | 4,110,343 |
| | 4,109,531 | 04 : | 4,109,322 | | 4,110,404 | | 4,110,258 | | 4,109,525 | | 4,110,398 |
| | 4,109,568 | | 4,109,638 | | 4,110,443 | | 4,110,335 | | 4,109,536 | | 4,110,410 |
| | 4,109,619 | | 4,109,745 | | 4,110,444 | | 4,110,353 | | 4,109,540 | | 4,110,412 |
| | 4,109,634 | | 4,109,886 | | 4,110,463 | | 4,110,473 | | 4,109,547 | | 4,110,418 |
| | 4,109,644 | | 4,109,954 | | 4,110,476 | | 4,110,491 | | 4,109,551 | | 4,110,419 |
| | 4,109,675 | | 4,110,021 | | 4,110,507 | 11 : | 4,109,335 | | 4,109,561 | | 4,110,471 |
| | 4,109,678 | | 4,110,571 | | 4,110,557 | | 4,110,142 | | 4,109,563 | | 4,110,479 |
| | 4,109,688 | | 4,110,605 | | 4,110,563 | 12 : | 4,109,327 | | 4,109,606 | | 4,110,481 |
| | 4,109,703 | 06 : | 4,109,325 | | 4,110,591 | | 4,109,392 | | 4,109,628 | | 4,110,517 |
| | 4,109,712 | | 4,109,328 | | 4,110,594 | | 4,109,404 | | 4,109,673 | | 4,110,584 |
| | 4,109,735 | | 4,109,340 | | 4,110,599 | | 4,109,449 | | 4,109,677 | | 4,110,698 |
| | 4,109,750 | | 4,109,341 | | 4,110,624 | | 4,109,670 | | 4,109,698 | | 4,110,699 |
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| | 4,109,762 | | 4,109,384 | | 4,110,686 | | 4,109,741 | | 4,109,739 | | 4,110,721 |
| | 4,109,825 | | 4,109,399 | | 4,110,691 | | 4,109,769 | | 4,109,744 | | 4,110,784 |
| | 4,109,846 | | 4,109,424 | | 4,110,709 | | 4,109,826 | | 4,109,753 | | 4,110,827 |
| | 4,109,957 | | 4,109,427 | | 4,110,715 | | 4,109,832 | | 4,109,767 | 18 : | 4,109,439 |
| | 4,109,998 | | 4,109,435 | | 4,110,726 | | 4,109,845 | | 4,109,786 | | 4,109,507 |
| | 4,110,017 | | 4,109,466 | | 4,110,737 | | 4,109,911 | | 4,109,787 | | 4,109,589 |
| | 4,110,080 | | 4,109,488 | | 4,110,758 | | 4,110,013 | | 4,109,795 | | 4,109,630 |
| | 4,110,206 | | 4,109,494 | | 4,110,798 | | 4,110,049 | | 4,109,812 | | 4,109,765 |
| | 4,110,219 | | 4,109,496 | | 4,110,800 | | 4,110,088 | | 4,109,837 | | 4,109,861 |
| | 4,110,329 | | 4,109,559 | | 4,110,809 | | 4,110,422 | | 4,109,847 | | 4,109,901 |
| | 4,110,332 | | 4,109,639 | | 4,110,831 | | 4,110,683 | | 4,109,852 | | 4,109,919 |
| | 4,110,475 | | 4,109,672 | | 4,110,837 | | 4,110,704 | | 4,109,854 | | 4,109,972 |
| | 4,110,501 | | 4,109,702 | | 4,110,842 | | 4,110,713 | | 4,109,855 | | 4,110,060 |
| | 4,110,562 | | 4,109,713 | 08 : | 4,109,419 | | 4,110,791 | | 4,109,916 | | 4,110,099 |
| | 4,110,604 | | 4,109,756 | | 4,109,718 | | 4,110,825 | | 4,109,936 | | 4,110,152 |
| | 4,110,606 | | 4,109,816 | | 4,109,927 | | 4,110,832 | | 4,109,950 | | 4,110,297 |
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| | 4,110,661 | | 4,109,887 | | 4,110,400 | | 4,109,592 | | 4,110,003 | | 4,110,330 |
| | 4,110,697 | | 4,109,889 | | 4,110,685 | | 4,109,658 | | 4,110,020 | | 4,110,339 |
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## PLANT PATENTS

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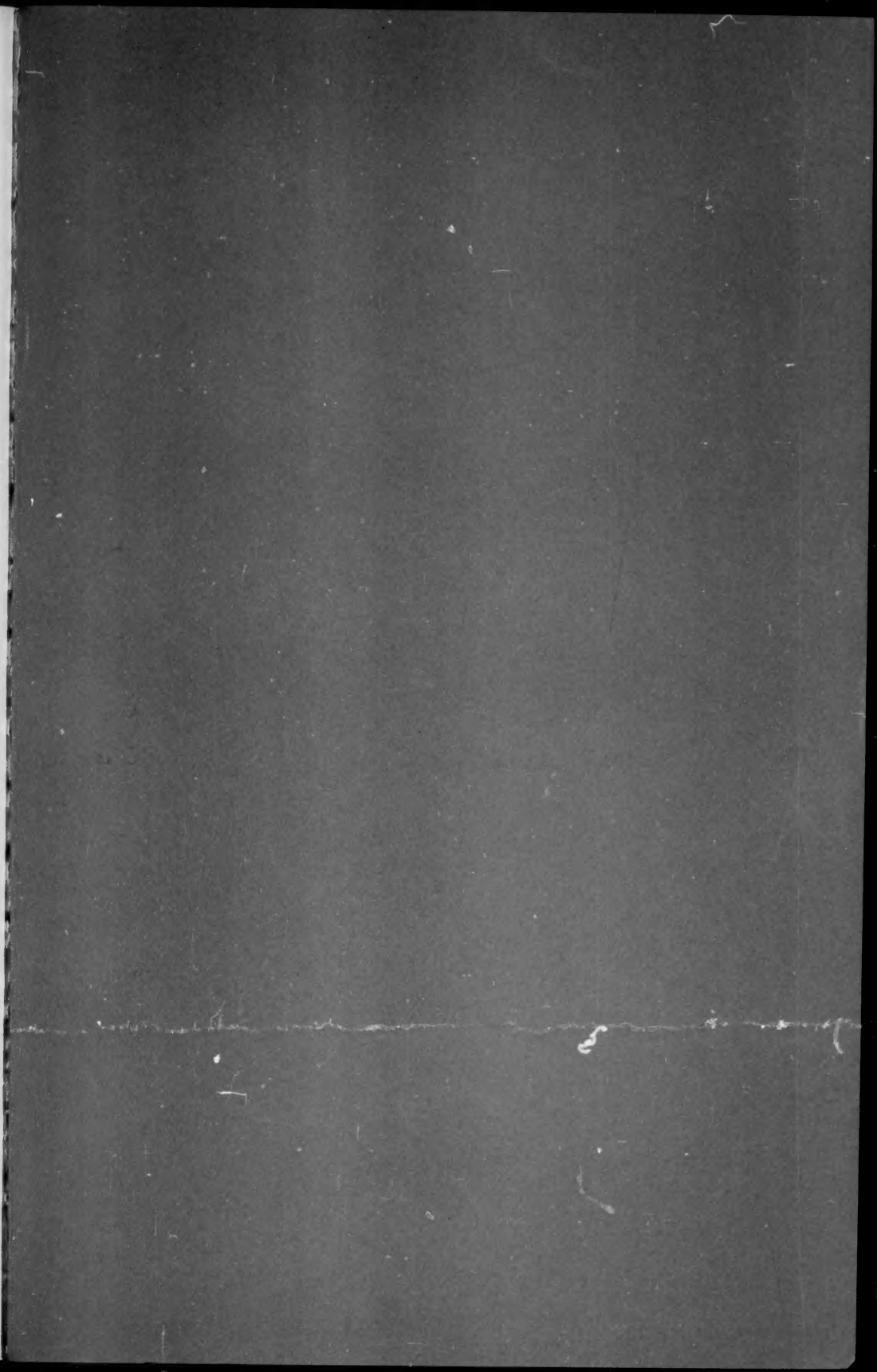

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